MDS-B3/B4P

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model

Photo : MDS-B3

SPECIFICATIONS

General

Power requirements	AC 120 V, 60 Hz (For the U.S.A. and Canada) AC 220 V to 240 V, 50/60 Hz (For Europe)
Power consumption	25 W
Operating temperature	5°C to 40°C (41°F to 104°F)
Storage temperature	–20°C to +55°C (–4°F to 131°F), without moisture condensation
Dimensions (w/h/d)	About 142 × 132 × 375 mm (5⅝ × 5¼ × 14⅞ inches)
Weight	About 5 kg (11 lb)

Laser characteristics

Laser:	Semiconductor laser
Wavelength:	780 - 790nm
Laser diode properties	Material: GaAlAs Emission duration: continuous Laser output: less than 44.6 µW (This output is the value measured at a distance of 200 mm from the lens surface on the optical pick-up block.)

Digital audio signal format

System	MiniDisc digital audio system
Disc	MiniDisc
Modulation format	EFM (Eight-to-Fourteen Modulation)
Digital audio channel	2 channels
Sampling frequency	44.1 kHz
Error correction	ACIRC (Advanced Cross Interleave Reed Solomon Code)
Rotation mode	CLV (about 400 to 900 r.p.m.)

Model Name Using Similar Mechanism		MDS-B1/B2P
Mechanism Type	MDS-B3	MDM-1D
	MDS-B4P	MDM-1E
Base Unit Type	MDS-B3	MBU-1A
	MDS-B4P	MBU-1B
Optical Pickup Block Type		KMS-140C

Input/output connectors

Analog input (MDS-B3 only)

Connector	XLR-3-31
Reference level	+4 dBs (factory set)
Adjustable range	–12 dBs to +8 dBs
Maximum level	+24 dBs
Input impedance	Approx. 10 kilohms, balanced

Analog output

Connector	XLR-3-32
Reference level	+4 dBs (load impedance 10 kilohms) (factory setting)
Adjustable range	–12 dBs to +8 dBs (load impedance 10 kilohms) (factory setting)
Maximum level	+24 dBs (load impedance 10 kilohms) (factory setting)
Output impedance	Approx. 250 ohms, balanced
Load impedance	More than 600 ohms

Digital input (MDS-B3 only)

Connector	RCA PHONO
Format	IEC958 digital audio interface (professional/consumer use)
Input impedance	75 ohms, unbalanced
Lock range	±0.1%

— Continued on next page —

MD RECORDER/PLAYER

SONY®

Digital output

Connector	RCA PHONO
Format	IEC958 digital audio interface (consumer use)
Output impedance	75 ohms, unbalanced

REMOTE (25P)

Connector	D-SUB 25-pins (female)
Format	Parallel
Input level	L: ground short (less than 100 ohms) H: open collector (high impedance)
Output level	L: less than 0.8 V (Imax.: 50 mA) H: open collector (Vmax.: 12 V)
+5 V output	Imax. 100 mA

RS-232C

Baud rate	Max 9600 baud (1200 baud/2400 baud/4800 baud/9600 baud, changeable by key operation)
Word length	Length 7 bits/Length 8 bits, changeable by key operation
Stop bit	Stop bit 1/Stop bit 2, changeable by key operation
Parity	Parity Odd/Parity Even/Parity Off, changeable by key operation

Audio characteristics

Frequency response	20 Hz to 20 kHz, ±0.5 dB
Signal-to-noise ratio	More than 83 dB (with A-weight filter, when playing back recordable disc) More than 95 dB (with A-weight filter, when playing back premastered disc)
Total harmonic distortion	Less than 0.095% (at reference level[1]), 1 kHz, when playing back recordable disc) Less than 0.06% (at reference level[1]), 1 kHz, when playing back premastered disc)
Wow and flatter	Below measurable limit (±0.001%, W. Peak)

Supplied accessories

Wired remote controller RM-DC1 (1) ※
Connecting cable (1) ※
Sony SUM-3 (NS) batteries ※
AC power cord (1)
Operation manual (1)
※ : MDS-B3 only

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[1] The reference level is the level at –20 dB from the full bit on the peak level meter scale.

Design and specifications are subject to change without notice.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

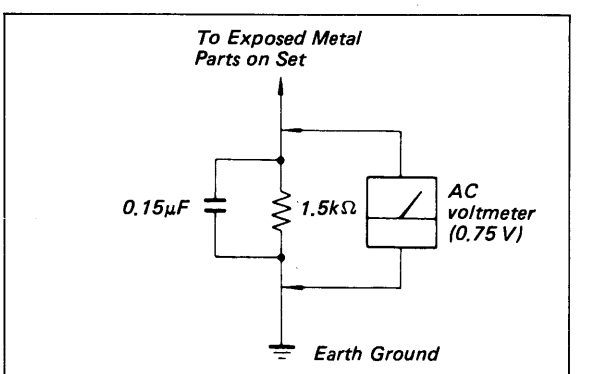
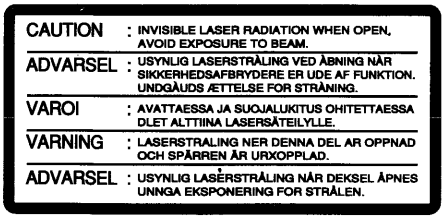


Fig. A. Using an AC voltmeter to check AC leakage.

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

The following caution label is located inside of the unit.


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅUDS ÆTTELSE FOR STRÅNING.
VARO! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA LASERSÄTEILYLLE.
VARNING : LASERSTRALING NER DENNA DEL AR OPPNAD OCH SPÄRREN ÄR URXOPPLAD.
ADVARSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGA EKSPONERING FOR STRÅLEN.

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SERVICING NOTE

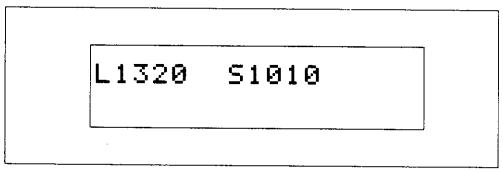
1. MAINTENANCE SCHEDULE

• Maintenance Procedures

In order to achieve the above purposes, the replacement of consumable parts, the cleaning of other mechanical parts, and the check and adjustment of the electrical system are periodically carried out. For the execution time, it is advisable to use a reading of the HOURS METER in the display menu or to acquire the time using a personal computer via the RS-232C. Depending on the reading of the head hours meter, the guidelines for maintenance and check as well as parts to be replaced are listed below. Note that the frequency for replacing each part is based on its life estimated on the experience, but it may be changed from future data.

Part Name (Part No.)	Reading of Hours Meter and replacement interval
DEVICE, MINI DISC KMS-140C (8-583-005-11)	Replace the pickup every 1,500 hours.
CHASSIS (BU) COMPLETE ASSY (A-4660-222-A)	Replace the spindle motor every 3,000 hours.
BELT (LOADING) (4-957-797-01)	Replace the loading belt every 3,000 hours.

The hours meter showing the accumulated operating times appears.



L: Accumulated laser diode operating time.
S: Accumulated spindle motor operating time.

Refer to the L value for replacing the pickup, and the S value for replacing the loading belt and spindle motor.
For the model MDS-B4P (playback only machine), the L value is kept to "0000".

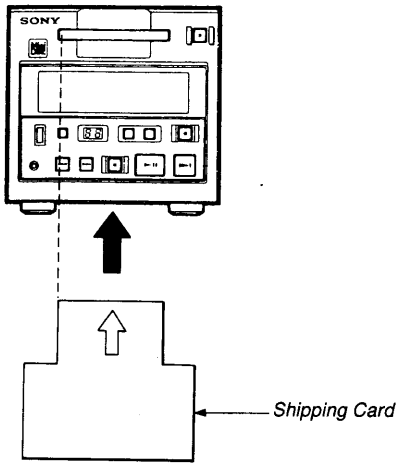
NOTE: • For indication of Hours meter, see page 29 (7-5. Reading the Hours Meter).
• When replacing the KMS-140C, adjust the Focus gain and Tracking gain adjustment.
• For the acquisition of time using a personal computer via the RS232C, refer to the "HOUR METER SENSE" on page 76.

2. SHIPPING MODE

• After service work is finished, be sure to set the disc chucking mechanism in the shipping mode.

• To set the machine in the shipping mode.

1. Turn the unit ON.



2. Align shipping card (3-702-670-01) against the left side of the disc compartment, then insert it. (The motor starting sound will be heard.)
3. After you hear the motor start up, withdraw shipping card.
4. Turn OFF the unit while ⌜TOC Reading⌟ appears in the display window. (The shipping mode is automatically released when the power switch is turned on next time.)

1-1 Features

1-1-1 Features of the MiniDisc Recorder

ATRAC (Adaptive Transform Acoustic Coding) data compression technology

By eliminating inaudible sound data to obtain a compression ratio of 1:5, ATRAC data compresion technology enables the recording of sound information of almost the same quality and quantity as a CD, but on a smaller disc.

74 minutes of playback or recording (Recording mode is the MDS-B3 only)

A single MD can be used to play back or record up to 74 minutes of sound information, far exceeding the capacity possible with IC memories.

Direct track access

You can use the supplied remote controller to directly access any of 255 MD tracks, without the long cuing time required for tape.

Various playback functions

The MDS-B3's various playback functions include repeated playback of tracks and programmed playback of tracks.

Multiple editing functions (MDS-B3 only)

The MDS-B3's editing functions allow you to divide, combine and move tracks, as well as monitor the sound while dividing tracks. Unlike tracks on analog cassette tape, specific MD tracks or an entire MD can be erased instantly.

Text entry (MDS-B3 only)

You can use the supplied wire-connected remote controller to enter text to create titles for recorded discs and tracks. Titles, which may be as long as 100 characters per title and totaling 1,792 characters per disc, appear in the display window during playback.

Durability

Because the MDs use a non-contact system like compact discs, they are superior to the cassette tape in durability.

1-1-2 Operational Features

AUTO PAUSE function

You can use the AUTO PAUSE function to place an MD in playback pause at the beginning of a track, then press the PLAY/PAUSE key to start playback. Use this function to pre-cue tracks during on-the-air broadcasting with multiple MD recorders.

AUTO CUE function

When the AUTO CUE function is on, the MD recorder enters playback pause when it detects a rise in the audio signal (above –54 dB) following the inaudible portion at the start of a track.
This function is effective for delivering special sound effects in theater productions, etc.

Playback display variations

While entering a track title, you can use a semicolon to divide the title, then display each part separately during playback by pressing the DISPLAY key. By holding down the DISPLAY key, you can also display the remaining playing time of the track alternately with the track title or elapsed playing time (auto display function).

LevelSync setting function (MDS-B3 only)

LevelSync setting is essentially the adding of track numbers at specified points while recording. Track numbers can be added automatically or manually.

End-of-message (EOM) indication

The display indication flashes when that the end of the track approaches (EOM indication). You can specify flashing to start at between 1 and 35 seconds before the end of the track.

This section is extracted from instruction manual.

1-1 Features

Hours meter

The hours meter displays the accumulated time of laser diode recording operations and spindle motor operation. Use this information as the basis for replacing the BU block.

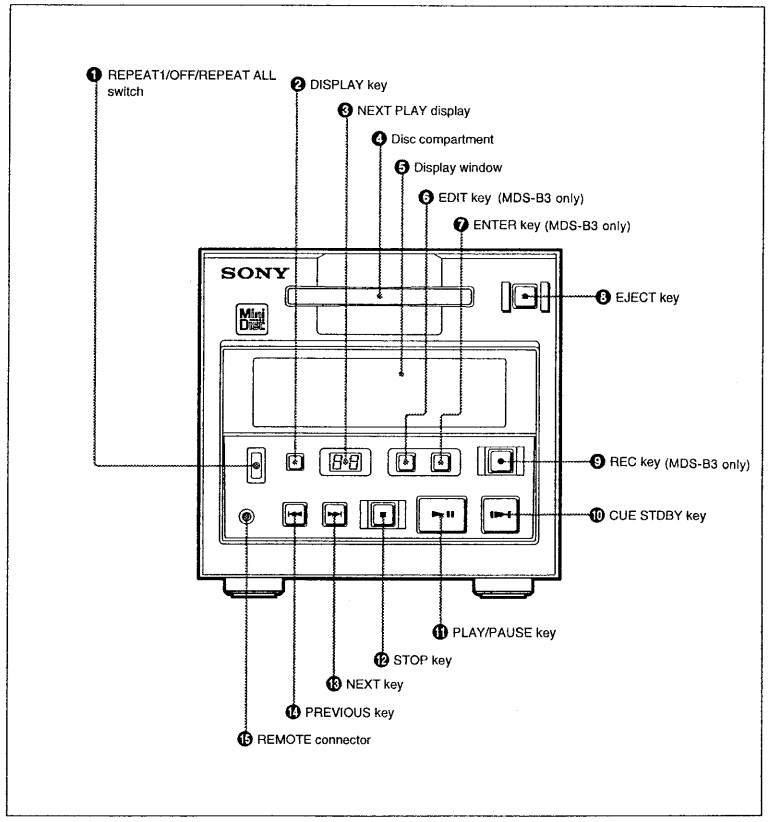
Remote control function

The MD recorder can be controlled by external control signals sent to the MDS-B3 through the REMOTE (25-pin) connector on the rear panel.
You can use a personal computer or other external equipment to control the MDS-B3 through the RS-232C connector.

Rack mounting compatibility

Three MD recorders can be mounted side by side in a standard 19" EIA rack.

2-1 Front Panel



Front panel of the MDS-B3

❶ REPEAT1/OFF/REPEAT ALL switch
Use to select repeated playback.
REPEAT1: The MD recorder plays back the current track repeatedly.
REPEAT ALL: The MD recorder plays back all tracks repeatedly and in sequential order.
OFF: The MD recorder plays back each track once.

❷ DISPLAY key
Press this key to display disc information. The following items appear in sequential order each time you press this key.
When the recorder is stopped: Disc title, total track number and total disc playing time, remaining recording time on disc. (In case of premastered discs: disc title, total track number and total disc playing time.)
During playback or playback pause: Track title, remaining playing time of current track, and elapsed playing time.
Hold down the key for three seconds while the track title is on and the remaining playing time will alternate with the track title in the display (auto display function).
During recording: Elapsed recording time of current track, remaining recording time on disc.
Press the DISPLAY key together with the STOP key to activate the menu setting function.

❸ NEXT PLAY display
Shows the next track number to be played after the current track. When the track number exceeds 99, "— —" appears on the display.

❹ Disc compartment
Automatically loads an inserted disc.

❺ Display window
Indicates the current MD recorder operating status, such as disc title, track title, track number, and elapsed time.

❻ EDIT Key (MDS-B3 only)
Press to select or cancel an editing function.

❼ ENTER Key (MDS-B3 only)
Press to execute a specified editing function.

❽ EJECT key
Press to eject the disc from the disc compartment. This key lights when no disc is loaded, and flashes during loading of a disc.

❾ REC (recording) Key (MDS-B3 only)
Press once to pause recording, then press PLAY/PAUSE key to start recording. The REC key lights when recording is paused or proceeding.

❿ CUE STDBY (standby) key
Press to return to the position where you last pressed the PLAY/PAUSE key. After finding the position, MD recorder enters playback pause. Use this key to check or return to a cuing position.

⓫ PLAY/PAUSE key
Press to start playback or recording.
Press during playback to temporarily stop the MD recorder; press again to cancel pause.
The PLAY/PAUSE key lights while the MD recorder is playing back or recording. It flashes while the MD recorder is in playback pause or recording pause.

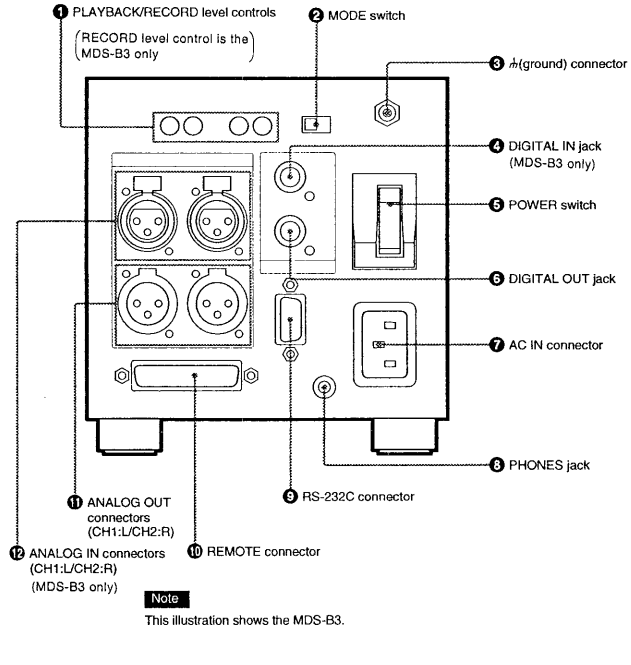
⓬ STOP key
Press to stop playback or recording, or to cancel program play.

⓭ NEXT key
Press to cue to the beginning of the next track.
Hold down this key during playback to scan forward while monitoring the sound.

⓮ PREVIOUS key
Press to cue to the beginning of the previous track.
Hold down this key during playback to scan backward while monitoring the sound.

⓯ REMOTE connector
Connect the supplied remote controller here.

2-2 Rear Panel


❶ PLAYBACK/RECORD level controls
(RECORD level control is the MDS-B3 only
❷ MODE switch
❸ ⏚(ground) connector
❹ DIGITAL IN jack (MDS-B3 only)
❺ POWER switch
❻ DIGITAL OUT jack
❼ AC IN connector
❽ PHONES jack
❾ RS-232C connector
❿ REMOTE connector
⓫ ANALOG OUT connectors (CH1:L/CH2:R)
⓬ ANALOG IN connectors (CH1:L/CH2:R) (MDS-B3 only)

Note
This illustration shows the MDS-B3.

Rear panel

❶ PLAYBACK/RECORD level controls
Adjust the analog input/output reference level during recording or playback by turning the control for each channel (CH-1:L/CH-2:R) with a bladed screwdriver. (RECORD level control is the MDS-B3 only)

❷ MODE switch
Use to select monaural or stereo mode for the analog input/output signal.
When MONO is selected during playback, the signals of channel 1 and 2 are lowered to below –6 dB, then output from ANALOG OUT CH-1(L) and CH-2(R).
When MONO is selected during recording, the signal from ANALOG IN CH-1(L) and ANALOG IN CH-2(R) are lowered to below –6 dB, then recorded to channels 1 and 2.

Note
If a signal is recorded from only one ANALOG IN connector in MONO mode, the recording level will be –6 dB lower than that recorded in STEREO mode. In this case, use the PLAYBACK/RECORD level control to bring the recording level up to that of STEREO mode. (MDS-B3 only)

❸ ⏚ (ground) connector
Connect directly to the ground.

❹ DIGITAL IN jack (RCA pin-jack) (MDS-B3 only)
Inputs digital audio signals for professional use (IEC958-TYPE1) or consumer use (IEC958-TYPE2).

❺ POWER switch
Press to turn on the MD recorder. Press again to turn the MD recorder off.

❻ DIGITAL OUT jack
Outputs digital audio signals for consumer use (IEC958-TYPE2) during playback.

❼ AC IN connector
Connect to an AC outlet with the supplied AC power cord.

❽ PHONES jack
Use to connect headphones.

❾ RS-232C connector

You can use a personal computer connected to the MDS-B3's RS-232C connector to control the following MDS-B3 operations:

- Key operations
  PLAY/PAUSE, STOP, REC, EJECT, PREVIOUS, NEXT, CUE STDBY
- Direct track access
- Selecting menu functions
  Selecting the timing of the end-of-message indication (EOM function), setting the AUTO PAUSE and AUTO CUE functions, setting the LevelSync function, and selecting the input signal
- Displaying of time and character data and display messages on an external computer
- Setting the auto display function

Pin hole No.	Name	Function
2	RxDATA (RECEIVE DATA)	Inputs signals from the computer
3	TxDATA (TRANSMIT DATA)	Outputs signals to the computer
4	DTR (DATA TERMINAL READY)	Outputs data terminal ready status to the computer
5	GND (SIGNAL GROUND)	Ground for signal lines
6	DSR (DATA SET READY)	Inputs data set ready status from the computer
7	RTS (REQUEST TO SEND)	Outputs request to send signal to the computer
8	CTS (CLEAR TO SEND)	Inputs clear to send status from the computer

Pin holes not listed above are not connected.

❿ REMOTE connector (D-sub 25-pin)
Connect to external equipment for remote control.

Pin assignment

Pin No.	Signal	Pin No.	Signal
1	GND (for status out)	14	CUE STDBY LED OUT
2	PLAY STATUS OUT	15	PAUSE STATUS OUT
3	EOM STATUS OUT	16	REC STATUS OUT
4	STOP STATUS OUT	17	PLAY/PAUSE LED OUT
5	EJECT LED OUT	18	5 V
6	NEXT COMMAND IN	19	Reserved
7	GND (for command IN)	20	PLAY /PAUSE COMMAND IN
8	Reserved	21	STOP COMMAND IN
9	EDIT COMMAND IN	22	DISPLAY COMMAND IN
10	ENTER COMMAND IN	23	REC COMMAND IN
11	KILL LOCAL COMMAND IN	24	CUE STDBY COMMAND IN
12	Reserved	25	PREVIOUS COMMAND IN
13	Reserved		

Caution

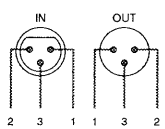
Do not set more than two COMMAND IN pins (pin numbers 6, 9, 10, 20, 21, 22, 23, 24, and 25) to LOW at the same time as this will cause the MD recorder to malfunction.

⓫ ANALOG OUT connectors (CH-1:L/CH-2:R, XLR 3-pin)
Output analog audio signals.

⓬ ANALOG IN connectors (CH-1:L/CH-2:R, XLR 3-pin) (MDS-B3 only)
Input analog audio signals.

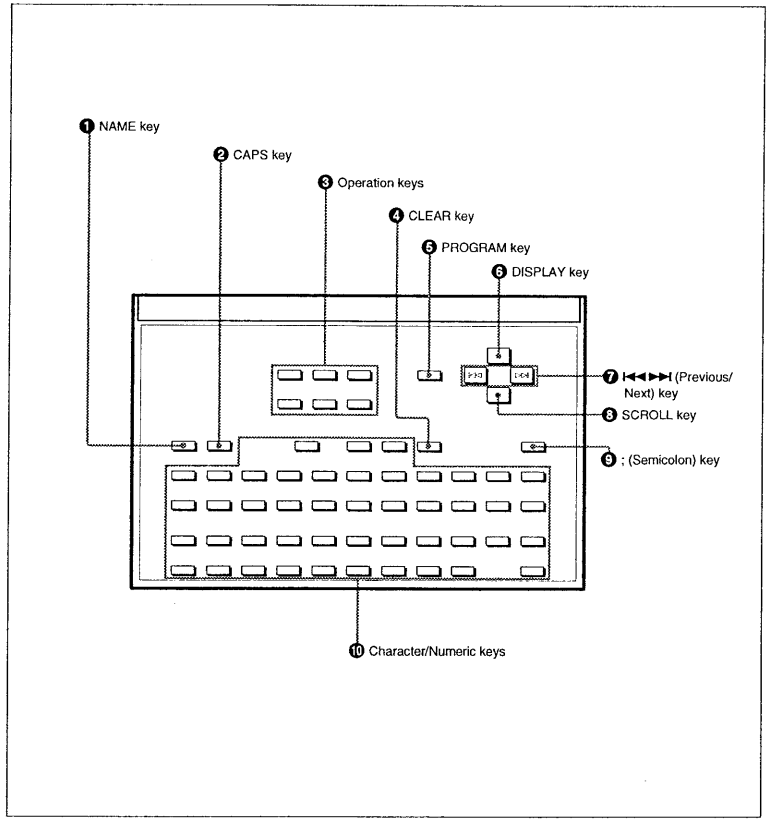
Pin assignment

Pin No.	Signal
1	GND
2	HOT
3	COLD



2-3 Remote Controller

Note : Not supplied of RM-DC1 (wired remote controller) for the model MDS-B4P.



Remote controller

❶ NAME key
Press to activate the title function.

❷ CAPS (capital letters) key
Press to enter uppercase letters.

❸ Operation keys
Use the following keys to do the same operations as the respective keys on the MD recorder.

EDIT/NO key
Press to specify or cancel an editing function.

ENTER/YES key
Press to execute a specified editing function.

REC (recording) key
Press once to pause recording, then press the PLAY/PAUSE key to start recording.

STOP key
Press to stop playback or recording, or to cancel program play.

PLAY/PAUSE key
Press to start playback or recording. Press during playback to temporarily stop the MD recorder; press again to cancel pause.

CUE STDBY (standby) key
Press to return to the position where you last pressed the PLAY/PAUSE key. After finding the position, the MD recorder enters playback pause. Use this key to check or return to a cuing position.

❹ CLEAR key
Press to erase an entered character or number.

❺ PROGRAM key
Press to activate program play.

❻ DISPLAY key
Press this key to display disc information. The following items appear in sequential order each time you press this key.
When the recorder is stopped: Disc title, total track number and total disc playing time, remaining recording time on disc. (In case of premastered discs: disc title, total track number and total disc playing time.)
During playback or playback pause: Track title, remaining playing time of current track, and elapsed playing time.
Hold down the key for three seconds while the track title or elapsed playing time is on and the display will alternate with the remaining playing time (auto display function).
During recording: Elapsed recording time of current track, remaining recording time on disc.
Press the DISPLAY key together with the STOP key to activate the menu setting function. (MDS-B3 only)

❼ ⏮⏭ (Previous/Next) key
Press the respective key to cue to the beginning of the previous or next track.
Hold down the key during playback to scan backward or forward with sound output.

❽ SCROLL key
Press to scroll titles over 13 characters in length.

❾ ; (Semicolon) key
Press while entering a title to divide the title into independently displayable parts.

❿ Character/Numeric keys
Use the numeric keys to specify tracks for immediate playback or program play. Use the character keys to enter disc and track titles.

3-1 Precautions

3-1-1 Installation Precautions

Install the MD recorder on a flat surface in a temperature-controlled room. Avoid using or storing the MD recorder at a location that is:
- extremely hot or cold.
- damp.
- subject to severe vibrations.
- subject to strong magnetic fields.
- subject to many hours of direct sunlight or close to heating equipment.

3-1-2 Handling Precautions

- Check the MD recorder's operating voltage before you plug it in. It must be identical with that of your local power supply.
- If you drop any liquid or metal object inside the MD recorder, immediately stop using it, unplug the power cord from the socket, and contact Sony service personnel.
- If the MD recorder will be unused for a long time, make sure to unplug its power cord from the socket. When unplugging the power cord, grasp it by the plug, not the cord.
- Never remove the cabinet. The laser light used in the MD recorder can cause damage to your eyes. If the MD recorder needs to be inspected, contact Sony service personnel.

Condensation

Bringing in the MD recorder from a cold place or turning on the room heating may cause moisture to condense on the lens within the MD recorder, resulting in abnormal operation. If this occurs, leave the power on. The moisture will evaporate within an hour and the MD recorder will function normally again. If the MD recorder does not operate normally after a few hours, contact Sony service personnel.

If trouble occurs

Should you detect abnormal noise, smell, or smoke, immediately turn off the power, unplug the power cord from the socket, and contact Sony service personnel.

AC power cord

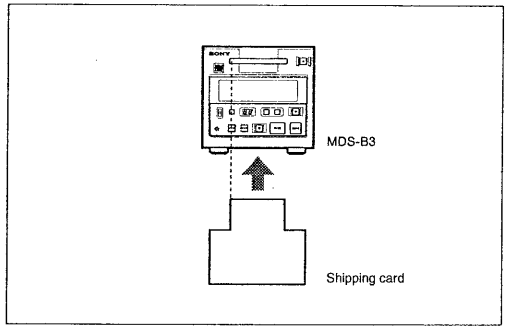
Do not use any power cord other than the one supplied with the MD recorder.

3-1-3 Shipping Precautions

When shipping the MD recorder, make sure the following conditions have been met:
- The MD recorder is in shipping mode.
- The MD recorder is packed in its original carton.

Please note that if these conditions are not met, any damage that occurs to the MD recorder during transport will not be covered by the service warranty.

Changing the MD recorder to shipping mode



Inserting the shipping card

1 Turn on the power.

2 Align the supplied shipping card against the left side of the disc compartment, then insert it.

3 After you hear the motor start up, withdraw the shipping card.

4 Turn off the power while "TOC Reading" appears in the display window.

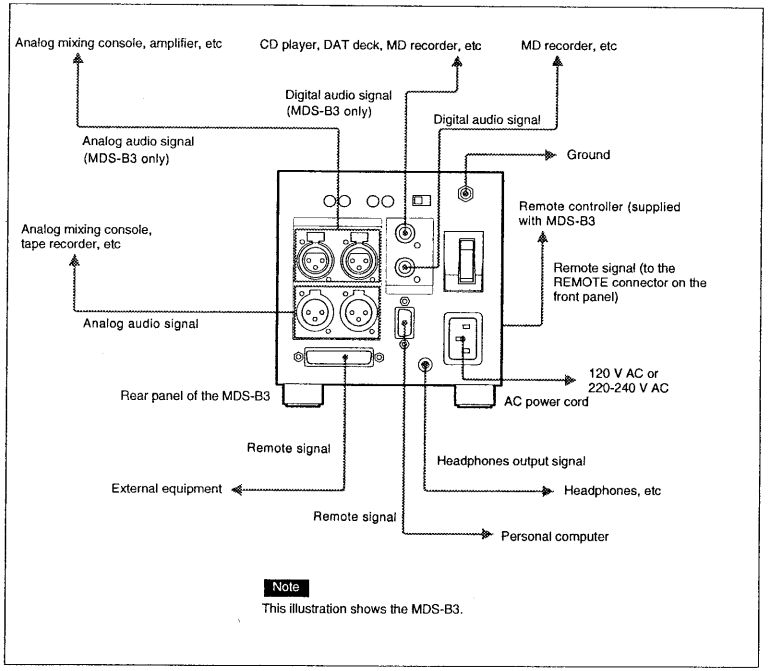
The MD recorder is now in shipping mode. This mode is automatically released when the MD recorder next turned on.

3-2 Connections

3-2-1 Precautions

- Turn off all equipment before connecting or disconnecting any cables.
- Insert all electrical plugs firmly since incomplete connections may cause noise.
- Use a cord somewhat longer than needed to prevent the plug from being pulled out when jarred or shaken.

3-2-2 Basic Connection Examples


Analog mixing console, amplifier, etc
CD player, DAT deck, MD recorder, etc
MD recorder, etc
Digital audio signal (MDS-B3 only)
Digital audio signal
Analog audio signal (MDS-B3 only)
Ground
Remote controller (supplied with MDS-B3
Analog mixing console, tape recorder, etc
Remote signal (to the REMOTE connector on the front panel)
Analog audio signal
120 V AC or 220-240 V AC
Rear panel of the MDS-B3
AC power cord
Remote signal
Headphones output signal
External equipment
Headphones, etc
Remote signal
Personal computer
Note
This illustration shows the MDS-B3.

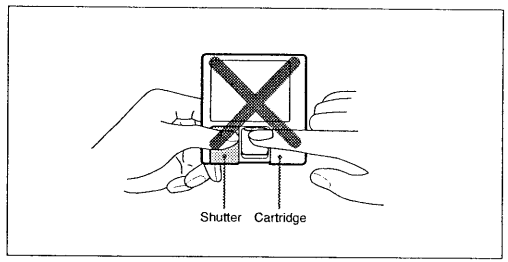
Basic connection examples

3-3 Handling MiniDiscs

Unlike CDs (Compact Discs), the MiniDisc is encased within a hard plastic cartridge which allows you to handle it without fear of dust or fingerprint contamination. However, a MiniDisc that has been contaminated or bent may cause the MD player to malfunction. To prevent damage to the contents of a disc and to enjoy clear sound permanently, take the following precautions when handling a MiniDisc:

Do not open the shutter to expose the disc

If you do so, the data on the disc may be damaged.



Handling MiniDiscs

Store MiniDiscs in a proper location

Do not place the cartridge where it will be subject to extremes of sunlight, temperature, moisture or dust.

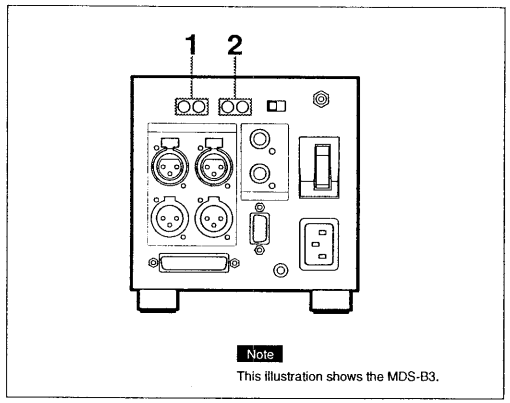
Cleaning the MiniDisc

Gently wipe the cartridge with a dry soft cloth to remove dust.

3-4 Setting the Analog Input/Output Reference Level

You can adjust the analog input/output reference level during recording or playback within a range of + 8 dB to –12 dB by turning the PLAYBACK/RECORD level controls on the rear of the MD recorder. The analog input/output reference level is set at +4 dB at –20 dB from the full bit level at the factory.

Setting the analog input/output reference level



Setting the reference level

1 Playback a disc recorded at –20 dB from the full bit. Adjust the output level of the ANALOG OUT connectors with the PLAYBACK (CH-1/CH-2) controls.

2 Input an audio signal to the ANALOG IN connectors and adjust the recording level with the RECORD (CH-1/CH-2) controls. (MDS-B3 only)

Note

Adjust the PLAYBACK/RECORD level controls with a bladed screwdriver. Do not use excessive force when turning the screwdriver or touch the screwdriver to any part other than the PLAYBACK/RECORD level controls.

4-1 Recording Procedure (MDS-B3 only)

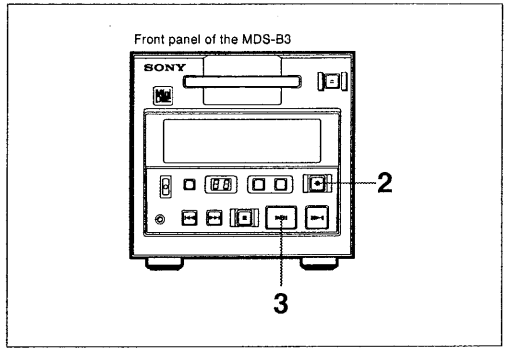
If the inserted disc already contains recorded material, the MD recorder will automatically record the new material at the end of the existing material with a new track number.

To adjust the recording level, see "3-4 Setting the Analog Input/Output Reference Level" on page 3-5.

To record track numbers automatically at points of low signal level, see "7-4 Recording a Track Number Automatically (LevelSync Setting)" on page 7-6.

Note

Before recording to a new disc or one that has been completely erased, record a 3- or 4-second blank track at the start of the disc to enable normal recorder operation. Once you have begun recording new material to subsequent tracks, the initial blank track becomes unnecessary and may be deleted with the erase function.



Recording procedure

1 Select either a digital or analog input signal.
See "7-6 Selecting the Input Signal (MDS-B3 only)" on page 7-8.

2 Press the REC key.
The MD recorder enters recording pause. (The REC key lights and the PLAY/PAUSE key flashes.)

3 Press the PLAY/PAUSE key.
Recording starts. (The REC and PLAY/PAUSE keys light.)

4 Play the sound source to be recorded.
The track number being recorded and elapsed recording time appear in the display.

To record a track number manually during recording

Press the REC key at the required point.

To stop recording

Press the STOP key.

To stop recording temporarily

Press the PLAY/PAUSE key.
To resume recording, press the PLAY/PAUSE key again.

To eject the disc

Press the STOP key to stop the MD, then press the EJECT key.

Note

If the MD recorder stays in recording pause for more than ten minutes, the MD recorder cancels recording pause, then stops.

Recording track numbers automatically

While inputting analog signals

Use the LevelSync setting which causes the MD recorder to record a track number whenever it detects a silent portion (i.e., the space between the tracks).

To use the LevelSync setting, see "7-4 Recording a Track Number Automatically (LevelSync Setting)" on page 7-6.

To set the input level, see "3-4 Setting the Analog Input/Output Reference Level" on page 3-6.

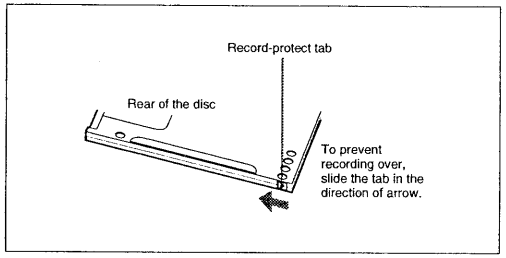
While inputting digital signals

When recording from a consumer CD player[1], MDS-B3 or MDS-B4P, the MDS-B3 automatically records track numbers on the basis of the level and U-bit of the digital input signal, whether or not the LevelSync setting is on or off.

[1] I.e., a CD player that is able to output digital signals with a Q-code added as a U-bit.

Preventing accidental erasure

Slide the record-protect tab to open the slot. To allow recording again, slide the tab to close the slot.



To protect a MiniDisc against accidental erasure

The recording system in your MD recorder is radically different from those used in cassette and DAT decks and is characterized by the limitations described below.

"Disc Full" lights up even before the disc has reached the maximum recording time (60 or 74 minutes)
When 255 tracks have been recorded on the disc, "Disc Full" lights up regardless of the total recorded time. More than 255 tracks cannot be recorded on the disc.

"Disc Full" lights up before the maximum number of tracks is reached
Fluctuations in emphasis within tracks are sometimes interpreted as track intervals, incrementing the track count.

The total recorded time and the remaining time on the disc may not equal the maximum recording time (60 or 74 minutes)
Recording is done in minumum units of 2 seconds each, no matter how short the material. The contents recorded may thus be shorter than the maximum recording capacity. Disc space may also be further reduced by scratches.

"TOC Reading" indication appears for a long time
If the inserted recorded disc is brand new, the "TOC Reading" indication appears on the display longer than for those that have been used.

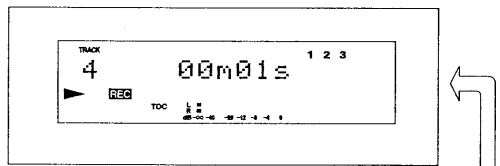
Playback of a track of under 4 seconds may be accompanied by sound dropout at the start of the next track or misoperation of the MD recorder.

4-2 Display Information During Recording (MDS-B3 only)

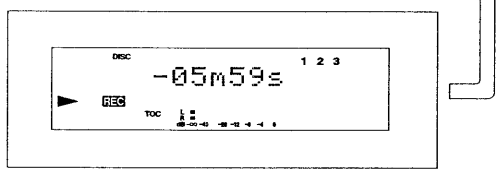
Changing the display information during recording

Each press of the DISPLAY key during recording changes the information on the display as follows:

• Recorded time of the current track



• Remaining recording time on disc

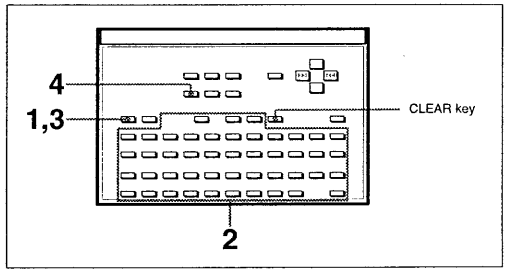


4-3 Adding Disc and Track Titles (MDS-B3 only)

Use the title function to add titles to your own discs and tracks with the character/numeric keys on the remote controller.
The maximum length of a single title is 100 characters, and the maximum number of characters for all titles on a disc is 1,792.
Newly added titles are temporarily stored in the recorder's memory (not saved to disc). To record the titles to the disc, press the STOP key or eject the disc before turning off the power.
For more details, see "6-1 Overview of Editing Functions" on page 6-2.

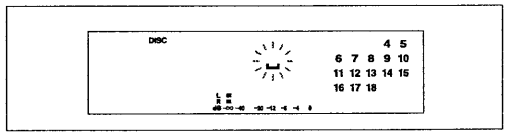
Adding a disc title

You can use this procedure while the MD recorder is stopped to add a title to the MiniDisc.



Adding a disc title

1 Insert the disc, then press the NAME key while the MD recorder is stopped.
A flashing cursor appears in the display.



2 Type in a disc title with the character/numeric keys on the remote controller.

3 Press the NAME key.
The disc title is entered.

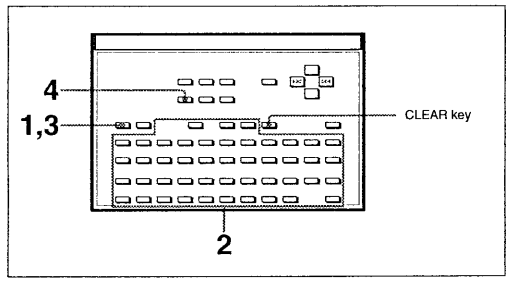
4 Press the STOP key.
The title is recorded to the disc.

Making a correction

Press the CLEAR key to erase a typing error, then enter the correct character.

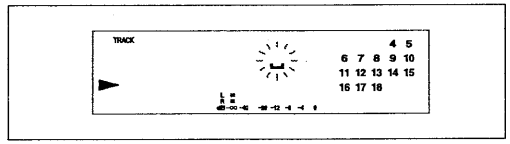
Adding a track title

Follow the procedure below to add a title to a track during playback, playback pause, or recording.



Adding a track title

1 Press the NAME key while playing, pausing or recording the track to be named.
A flashing cursor appears in the display.



2 Type in the track title with the character/numeric keys on the remote controller.

3 Press the NAME key.
The track title is entered.

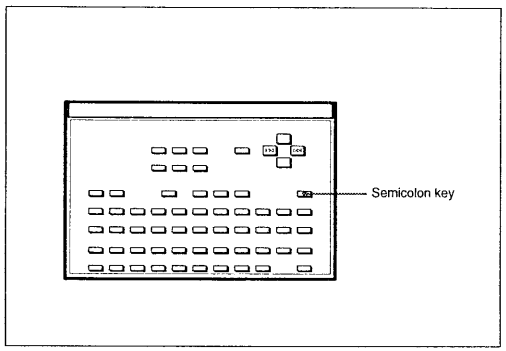
4 Press the STOP key.
The title is recorded to the disc.

Making a correction

Press the CLEAR key to erase a typing error, then enter the correct character.

Dividing a track title into separate parts

When you add a track title, you can divide it by using semicolons, then display each part independently by pressing the DISPLAY key during playback of the track.



Dividing a track title into separate parts

Note

If "Protected" appears in the display

The record-protection slot on the disc is open and titles cannot be written to the disc. To add titles to the disc, eject the disc and close the slot.

4-4 Restrictions on Digital Copying (MDS-B3 only)

Track mode data recorded to disc during recording

Track mode data are 8 bits of information recorded in the user TOC (Table Of Contents) area on the disc and indicating such disc-related conditions as copyright status, digital copy restriction, disc use, and emphasis data.
The two track mode bits d2 and d3 indicate copyright status and the restriction on digital copies.

Track mode

d1 [d2 d3] d4 d5 d6 d7 d8

d2 : Copyright status
- 0 : Copyrighted
- 1 : Uncopyrighted

d3 : Digital copy generation
- 0 : Original
- 1 : First generation copy or more

When recording an analog input signal or an IEC958-TYPE1 digital input signal (for professional use)

The disc will be completely copy-enabled within Serial Copy Management System.
This status is indicated by track mode bit values of d2=1 and d3=1.

When recording an IEC958-TYPE2 digital input signal (for consumer use)

Three types of discs can be produced, depending on the sub code information included in the input signal.

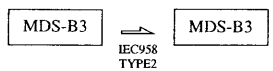
Input signal		Track mode bits		During digital copying between two consumer MD recorders
Category code	Channel status bit 2	d2	d3	
Category codes other than that below	1 (Uncopyrighted)	1	1	Copy-enabled
	0 (Copyrighted)	0	1	Copy-disabled
General ACTUAL A/D	–	0	0	First-generation copy only

4-4 Restrictions on Digital Copying (MDS-B3 only)

No restrictions are placed on digital copying of MD recordings made on professional MD recorders, as long as you use the MDS-B3.

The conditions for digital copying, as determined by track mode bits d2 and d3, are shown below.

When using two MDS-B3s



×11×××××	→	×11×××××	Copy-enabled
×00×××××	→	×01×××××	Copy-enabled
×01×××××	→	×01×××××	Copy-enabled

When using a consumer MD recorder to make a copy of a disc recorded on the MDS-B3

×11×××××	→	×11×××××	Copy-enabled
×00×××××	→	×01×××××	First generation copy only
×01×××××	→	Copy-disabled	

5-1 Overview of Playback Functions

Many playback functions can be used in a variety of ways in broadcasting. This section gives an overview of these functions and their application.

AUTO PAUSE and AUTO CUE functions

AUTO PAUSE function

When AUTO PAUSE is on, the MD recorder pauses after locating the track.

How to activate it: Specify by menu.

For details, see page 7-4.

Purpose: Prevents on-the-air mistakes by pausing the MD recorder right before the start of play. When AUTO PAUSE is off, the MD recorder starts playing back immediately after locating the track.

AUTO CUE function

When the AUTO CUE function is on, the MD recorder changes to playback pause when it detects a rise in audio signal during a silent portion (–54 dB or less).

How to activate it: Specify by menu.

For details, see page 7-4.

Purpose: For precise cueing to play back sounds instantly.

When the MD recorder reaches a track with no sound while AUTO CUE is on

During one-track repeat play: The MD recorder pauses at the beginning of the track.

During all-tracks repeat play or when the repeat play function is off: The MD recorder locates the point where the audio level rises at the beginning of the next track.

Relation between the track location operation and AUTO PAUSE/AUTO CUE function

The following table indicates the respective track location operation of the MD recorder in relation to AUTO PAUSE/AUTO CUE function.

When locating a specific track with the numeric keys

AUTO PAUSE and AUTO CUE off	Begins playback immediately after locating the specified track.
AUTO PAUSE on	Changes to playback pause after locating the beginning of the specified track.
AUTO CUE on	Changes to playback pause just as the audio level rises (above –54 dB) at the beginning of the located track.

When locating the beginning of a track by pressing the NEXT or PREVIOUS key (AMS)

AUTO PAUSE and AUTO CUE off	Displays the track number after locating the specified track, then stops.
AUTO PAUSE on	Changes to playback pause after locating the beginning of the specified track.
AUTO CUE on	Changes to playback pause just as the audio level rises (above –54 dB) at the beginning of the located track.

Repeat playback functions

Three types of repeat playback functions can be used.

One-track repeat playback

The MD recorder plays back a specific track repeatedly.

How to activate it: Set the REPEAT1/OFF/REPEAT ALL switch to REPEAT1.

Purpose: For repeated playback of the same material.

All-tracks repeat playback

The MD recorder plays back all tracks repeatedly and in sequential order.

How to activate it: Set the REPEAT1/OFF/REPEAT ALL switch to REPEAT ALL.

Purpose: For repeated playback of a recorded or edited disc with a particular track sequence.

Program repeat playback

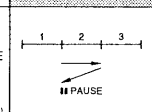
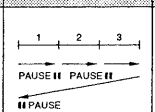
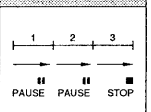
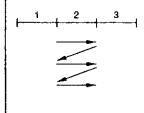
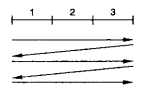
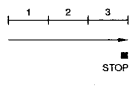
The MD recorder plays back a program repeatedly.

How to activate it: Set the REPEAT1/OFF/REPEAT ALL switch to either REPEAT1 or REPEAT ALL, then press the PROGRAM key.

Purpose: For repeated playback of the programmed tracks.

5-1 Overview of Playback Functions

The following table indicates the respective repeat play operation of the MD recorder in relation to AUTO PAUSE.

	During one-track repeat play	During all-tracks repeat play	When repeat play function is OFF
When AUTO PAUSE or AUTO CUE are on[a]			
When AUTO PAUSE and AUTO CUE are off			

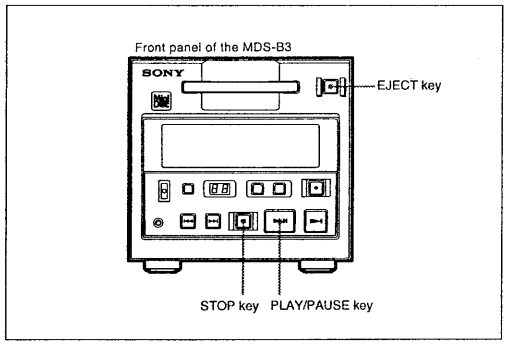
[a] When AUTO PAUSE is on, the MD recorder pauses after locating the track.
When AUTO CUE is on, the MD recorder pauses just as the audio level rises at the beginning of the located track.

Cue standby function

Pressing the CUE STDBY key causes the MD recorder to return to and enter playback pause at the last cueing position specified by pressing the PLAY/PAUSE key. Use this key to check or go to a previously set cueing position.
During program play, this function operates only within the currently playing track, and cannot be used to return to a cueing position within a previously played back.

5-2 Playback Procedure

5-2-1 Playing Back



Playing Back

Press the PLAY/PAUSE key.

When AUTO PAUSE and AUTO CUE are off:
The MD recorder starts playing. The current track title appears in the display.
When AUTO PAUSE is on:
The MD recorder enters playback pause at the beginning of the first track. The current track title appears in the display.
When AUTO CUE is on:
The MD recorder enters playback pause just as the audio level rises (above –54 dB) at the beginning of the first track. The current track title appears in the display.

To stop playback
Press the STOP key.

To stop playback temporarily
Press the PLAY/PAUSE key.
To restart playback, press the PLAY/PAUSE key again.

To eject the disc
Press the STOP key to stop playback, then press the EJECT key.

Your MiniDisc recorder is designed as a stereo system and cannot be used to play back monaural format MDs.

5-2-2 Locating a Specific Position (Search)

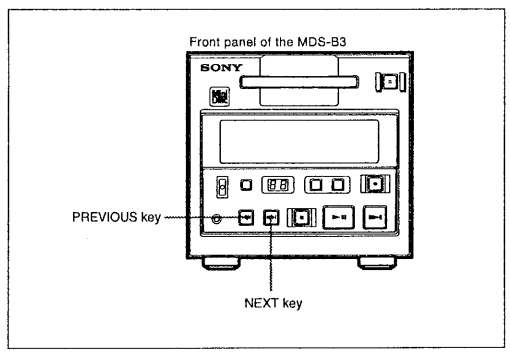
To find a specific position on the MD, use the NEXT and PREVIOUS keys during playback to quickly scan forward or backward.

To forward scan the disc
Hold down the NEXT key during playback. Releasing the key causes the MD recorder to play from the new location.

To backward scan the disc
Hold down the PREVIOUS key during playback. Releasing the key causes the MD recorder to play from the new location.

Note

Tracks created through editing may exhibit sound dropout during search operations.



Locating a specific position

5-3 Locating a Track

5-3-1 Locating a Specific Track

Access specific tracks instantly by entering their respective track numbers with the numeric keys on the remote controller.
If AUTO PAUSE and AUTO CUE are off, the MD recorder begins playback immediately after locating the specified track.
If AUTO PAUSE is on, the MD recorder changes to playback pause after locating the beginning of the specified track.
If AUTO CUE is on, the MD recorder changes to playback pause just as the audio level rises (above –54 dB) at the beginning of the located track.
For details on the AUTO PAUSE and AUTO CUE functions, see "7-2 Setting the Timing of the EOM Indication" on page 7-3.

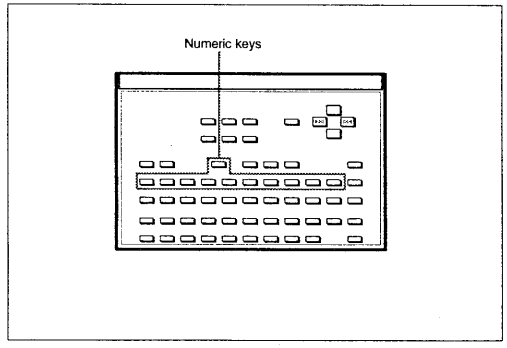
To specify track numbers greater than 10

Use the >10 key to specify the respective power of ten.

Example:

To locate the 15th track, press the >10 key once, then press 1 and 5.

To locate the 215th track, press the >10 key twice, then press 2, 1, and 5.



Locating a specific track

5-3-2 Locating the Beginning of a Track (AMS[1])

When the MD recorder is stopped or in playback pause, you can quickly skip to any track number before or after the current one by pressing the NEXT or PREVIOUS key. (Holding down a key causes the track numbers to change quickly.)
If AUTO PAUSE and AUTO CUE are off, the MD recorder displays the track number after locating the specified track, then stops.
If AUTO PAUSE is on, the MD recorder changes to playback pause after locating the beginning of the specified track.
If AUTO CUE is on, the MD recorder changes to playback pause just as the audio level rises (above –54 dB) at the beginning of the located track.
For details on the AUTO PAUSE and AUTO CUE functions, see "7-3 Pausing Before Playback (AUTO PAUSE and AUTO CUE Functions" on page 7-4.

To go to the beginning of a preceding track

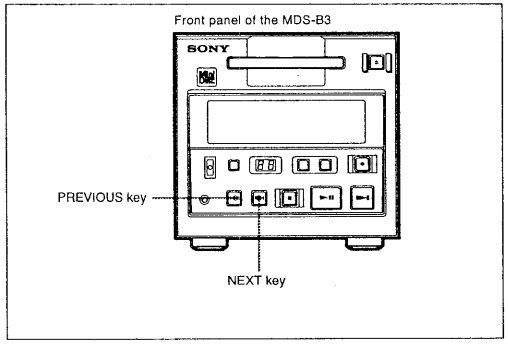
Press the PREVIOUS key. Each press of the key decreases the track number by one.

To go to the beginning of a proceeding track

Press the NEXT key. Each press of the key increases the track number by one.

To go quickly to the last track on the disc

Press the PREVIOUS key after inserting the disc.



Locating a specific track

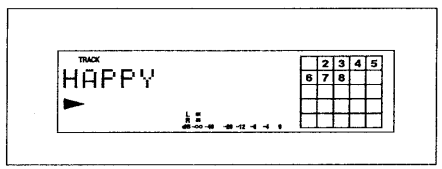
[1] AMS is the abbreviation for Automatic Music Sensor.

5-4 Display Information During Playback

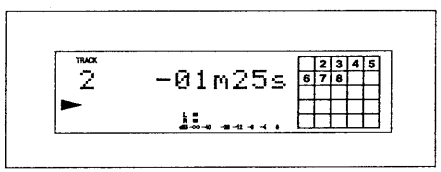
Changing the display information during playback

Each press of the DISPLAY key during playback or playback pause, changes the information on the display as follows:

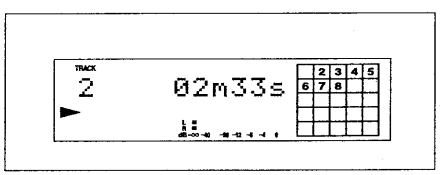
• Track title[1]



• Remaining playing time of the current track



• Elapsed playing time of the current track



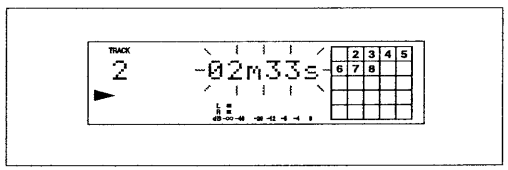
[1] If the track title has been divided into separate parts by semicolons, each part is displayed independently each time you press the DISPLAY key.
To divide a track title into separate parts, see "Dividing a track title into separate parts" on page 4-7.

Alternating display of title of current track and the remaining playing time (auto display function)

To cause the title of current track and remaining playing time to alternately appear on the display, hold down the DISPLAY key for about three seconds during playback, then release it.
Use this function when you want to check the remaining time and title of the current track during playback.
To cancel the alternating display, hold the DISPLAY key down for about three seconds again.

When an end of a track approaches

When the end of a track approaches, the indication in the display starts to flash (EOM indication).
To specify the timing of the indication, see "7-2 Setting the Timing of the EOM Indication" on page 7-3.



Display when the end of the track approaches

Note

If the EOM indication function activates while the auto display function is on, the track title stays on and begins to flash.

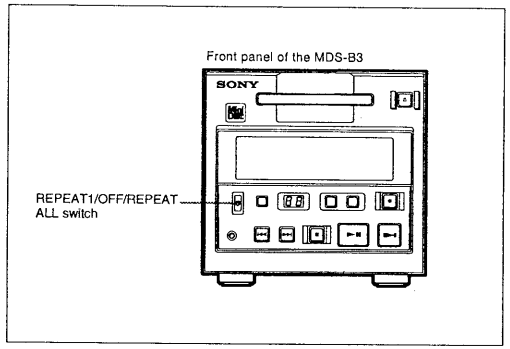
5-5 Playing Tracks Repeatedly

You can select the following repeat functions with the REPEAT1/OFF/REPEAT ALL switch.

REPEAT1: The MD recorder plays back the current track repeatedly.

OFF: The MD recorder plays back each track once.

REPEAT ALL: The MD recorder plays back all tracks repeatedly and in sequential order. During program play, the MD recorder plays back selected tracks in a programmed order repeatedly.



Playing tracks repeatedly

Once you have specified the repeat function during program play, you cannot use the REPEAT1 setting to playback repeatedly individual tracks within the program.

5-6 Playing Back a Program (Program Play)

Use the program play function to specify the playback sequence of multiple tracks.

1 Press the PROGRAM key of the remote controller while the MD is stopped.
The PROGRAM indicator turns on.

2 Enter the numbers of the tracks to be played in the order of their playback.
When you enter a track number, the display shows the track number and the order of the specified track, followed by the total program time.

3 Press the PLAY/PAUSE key.
When AUTO PAUSE and AUTO CUE are off:
Program play starts from the first track of the program.
When AUTO PAUSE is on:
The MD recorder enters playback pause at the beginning of the first track of the program.
When AUTO CUE is on:
The MD recorder enters playback pause just as the audio level rises (above –58 dB) at the beginning of the first track of the program.

To enter track numbers greater than 10

Press the >10 key to indicate the respective power of ten.

Example:

To enter the 15th track, press the >10 key once, then press 1 and 5.

To enter the 215th track, press the >10 key twice, then press 2, 1, and 5.

To erase tracks from a program

Press the CLEAR key. The displayed track number is erased from the program. To continue erasing tracks one at a time, press the CLEAR key repeatedly.

To erase an entire program

Press the STOP key.

To stop program play

Press the STOP key. Pressing the STOP key again erases the entire program.

To cancel program play

Press the PROGRAM key.
The PROGRAM indicator turns off.

6-1 Overview of Editing Functions (MDS-B3 only)

Purpose of editing functions

The MDS-B3 editing functions allow you to rearrange the contents of recorded MDs to make it easy to locate specific tracks during playback.

Front panel or remote controller operations

You can do MD editing on either the front panel on the MD recorder or the remote controller. Editing procedures are identical in both cases, except in the specification of tracks to be edited, which is done with the numeric keys on the remote controller and with the NEXT and PREVIOUS keys on the front panel.

Selecting the editing function

Select the editing function by pressing the EDIT/NO key. Each press of the key displays a different editing function as follows:

- Erase? — For erasing recorded tracks
- Divide? — For dividing recorded tracks
- Combine? — For combining recorded tracks
- Move? — For moving recorded tracks

Tips on editing

If an editing procedure increases or decreases the number of tracks on the MD, the MD recorder will automatically renumber the tracks on that MD. For example, if you erase the second track, the third track becomes track 2, and all proceeding track numbers decrease by one. Since track numbers may change several times during editing operations, you should check the name and contents of all tracks as you edit them.

STOP key function

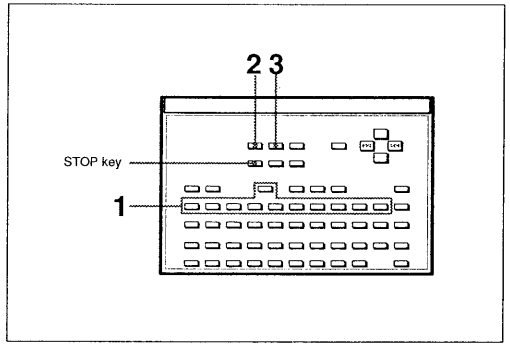
If you make any changes to an MD using the editing functions, you must press the STOP key to record the changes in the table of contents (TOC) area of the disc before turning off the MD recorder. If you don't do this, the editing changes will not be saved and the original MD contents will be unchanged.
You can press the STOP key to record changes after each editing operation, or save all changes together by pressing STOP or EJECT key after the last editing operation.

6-2 Erasing Recordings (Erase Function) (MDS-B3 only)

Use the erase function to erase a single track, successive tracks, or all tracks from a recorded disc.
After erasing a track, each track number following the erased track and the total number of tracks decrease by one.

Erasing a single track

You can erase a single track while the MD recorder is stopped, playing, or in playback pause status.



Erasing a single track

1 Enter the number of the track to be erased with the numeric keys (or the NEXT or PREVIOUS key on the front panel).

2 Press the EDIT/NO key until "Erase?" appears.

3 Press the ENTER/YES key.
"Complete" appears for a few seconds, then disappears when the specified track has been erased.

To continue erasing tracks

Repeat steps 2 and 3 to erase more tracks.

To cancel the erase function

Press the EDIT/NO or STOP key to make "Erase?" disappear.

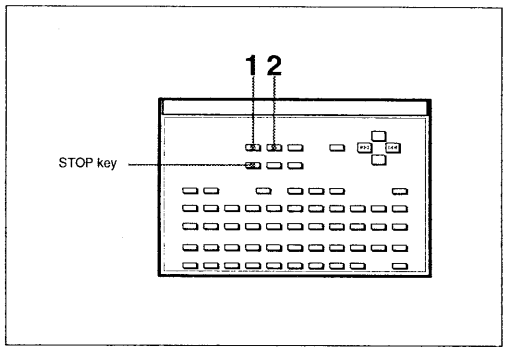
6-2 Erasing Recordings (Erase Function) (MDS-B3 only)

Notes

- If "Erase!!?" appears, it means that the track was recorded or edited on another MD recorder and is write-protected. To erase the track, press the ENTER/YES key while "Erase!!?" is displayed.
- If "Protected" appears, it means that the record-protect slot on the MD is open and the track cannot be erased. Eject the disc and close the slot, then reinsert the MD to erase the track.

Erasing all tracks on an MD

You can erase all tracks on an MD when the MD recorder is stopped.



Erasing all tracks

1 Hold down the EDIT/NO key for about a second until "All Erase?" appears.

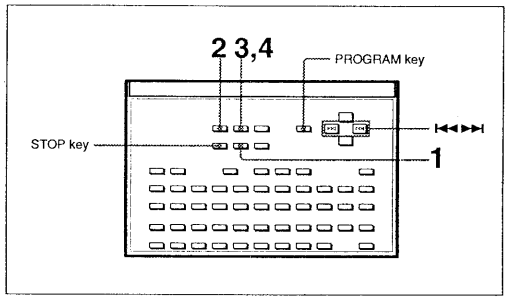
2 Press the ENTER/YES key.
"Complete" appears for a few seconds, then disappears when all recorded tracks have been erased.

To cancel the Erase Function
Press the EDIT/NO or STOP key to make "All Erase?" disappear.

The remaining recording time does not increase even after erasing numerous short tracks
Tracks of under 8 seconds in length are not counted and so erasing them may not lead to an increase in the recording time.

6-3 Dividing a Recorded Track (Divide Function) (MDS-B3 only)

To randomly access certain portions of a track, the divide function allows you to create separate tracks for each portion. You can also use the divide function to erase selected portions of a track, by first specifying the portion as a separate track, then erasing that track *(see "6-2 Erasing Recordings (Erase Function) on page 6-3)*.
Do the divide function while playing the disc.

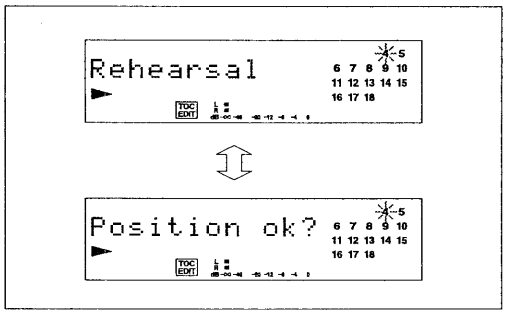


Dividing a recording track

1 While playing the track to be divided, press the PLAY/PAUSE key at the point where the new track is to begin.
The MD recorder changes to playback pause.

2 Press the EDIT/NO key until "Divide?" appears.

3 Press the ENTER/YES key.
"Rehearsal" and "Position ok?" alternately appear and the starting portion of the new track plays back repeatedly.



(Continued)

4 When you find the correct position, press the ENTER/YES key.
"Complete" appears for a few seconds, then disappears when the track has been divided. The MD recorder then begins playing from the point of division.

If the starting position is incorrect

Press the EDIT/NO key, then, while monitoring the sound, press the ▶▶| (Next) or |◀◀ (Previous) key to change the starting position.
You can move the starting position in steps of ±0.06 seconds, up to −128 to +127 steps from the original position.
"Rehearsal" and "Position ok?" alternately appear in the display while the starting position plays repeatedly.

To change the step interval

Press the PROGRAM key to select ±1 for a step interval of ±0.06 second, or ±2 for a step interval of ±0.12 second.

To cancel the divide function

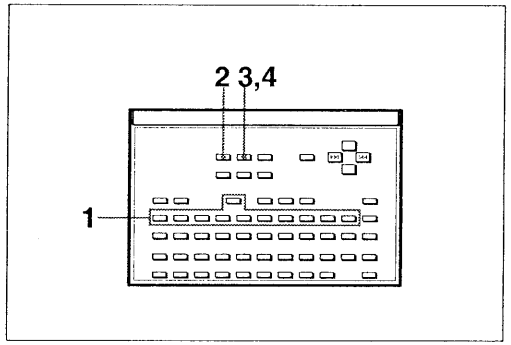
Press the EDIT/NO or STOP key to make "Divide?" disappear.

Notes

- A new track created by the divide function will have no title even if the original track has one.
  To add a title to the new track, see "4-3 Adding Disc and Track Titles" on page 4-5.
- If "Protected" appears, it means that the record-protect slot is open and the track cannot be divided. Eject the disc and close the slot, then reinsert the MD and divide the track.

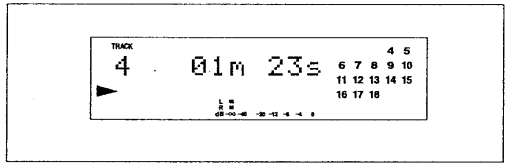
6-4 Combining Recorded Tracks (Combine Function) (MDS-B3 only)

Use the combine function to combine consecutive tracks on a recorded disc.
You can combine tracks while the MD recorder is stopped, playing, or in playback pause status.



Combining recorded tracks

1 Specify the second track of the two tracks to be combined with the numeric keys (or the NEXT and PREVIOUS keys on the front panel).
For example, enter 4 to combine tracks 3 and 4.

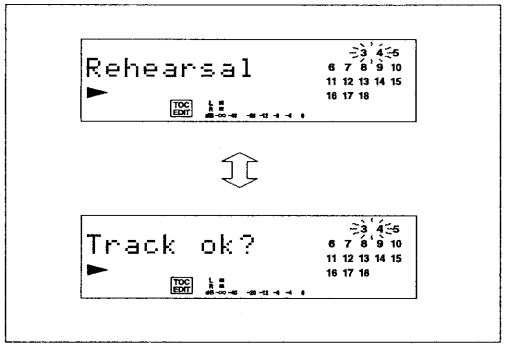


2 Press the EDIT/NO key until "Combine?" appears.

(Continued)

6-4 Combining Recorded Tracks (Combine Function)(MDS-B3 only)

3 Press the ENTER/YES key.
"Rehearsal" and "Track ok?" appear alternately and the position where the two tracks are to be joined (i.e., the end of the first track and the beginning of the second track) plays back repeatedly.
If the position is incorrect, press the EDIT/NO key to cancel the combine function.
Repeat steps 1 to 3 until you find the correct position.



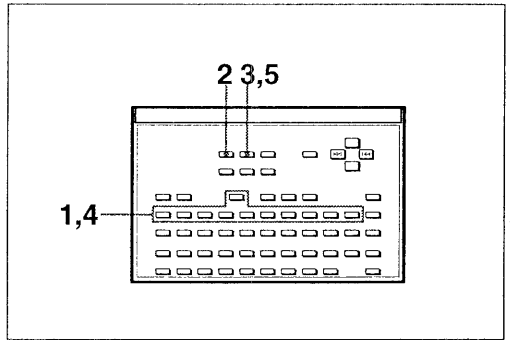
4 If the position is correct, press the ENTER/YES key.
"Complete" appears for a few seconds, then disappears when the tracks have been combined.

Notes

- If the "Sorry" appears, the specified tracks cannot be combined. Extensive editing of the same track may make it impossible to combine with another track. This is due to the technical limitation of the MD recorder and is not a mechanical error.
- If both tracks to be combined have track titles, the title of the second track is erased and title of the first track is used as the title of the combined track.
- If "Protected" appears, it means that the record-protect slot is open and the tracks cannot be combined. Eject the disc and close the slot, then reinsert the MD and combine the tracks.

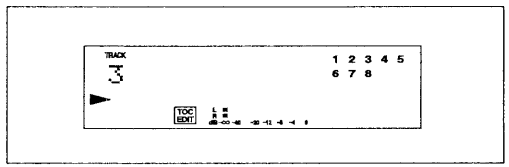
6-5 Moving Recorded Tracks (Move Function) (MDS-B3 only)

Use the move function to change the order of specific tracks.
You can change the order of the tracks while the MD recorder is stopped, playing or in playback pause status.

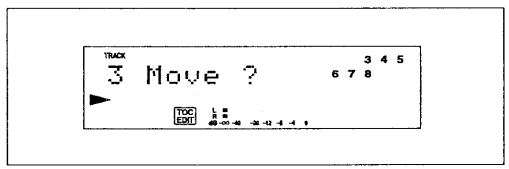


Moving recorded tracks

1 Specify the track to be moved with the numeric keys (or the NEXT and PREVIOUS keys on the front panel).
For example, enter 3 to move track 3.

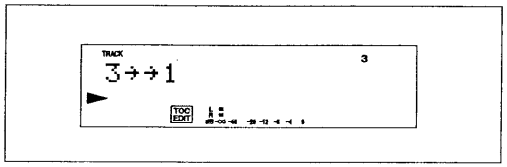


2 Press the EDIT/NO key until "Move?" appears.

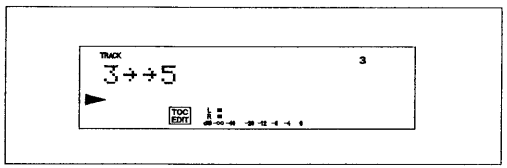


(Continued)

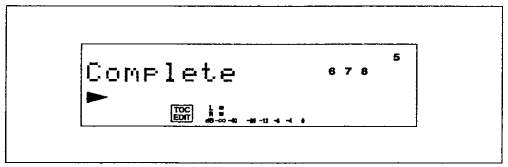
3 Press the ENTER/YES key.
The number of the track to be moved and the new track position appear.



4 Specify the new position of the specified track with the numeric keys (or the NEXT and PREVIOUS keys on the front panel).
For example, enter 5 to move track 3 to track position 5.



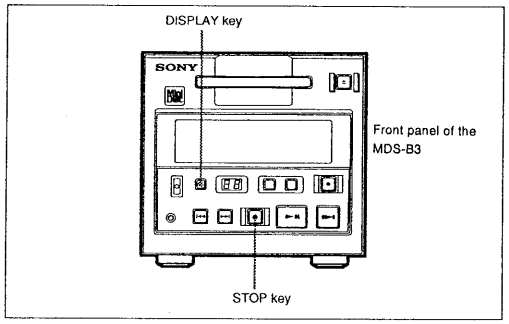
5 Press the ENTER/YES key.
"Complete" appears for a few seconds, then disappears when the track has been moved.



Note

If "Protected" appears, it means that the record-protect slot is open and the track cannot be moved. Eject the disc and close the slot, then reinsert the MD and move the track.

7-1 Using the Menu Functions



Activating menu functions

Activating the menu

Press the STOP and DISPLAY keys on the front panel of the MD recorder simultaneously.

To select a menu function

Press the DISPLAY key. The menu function display changes as follows:

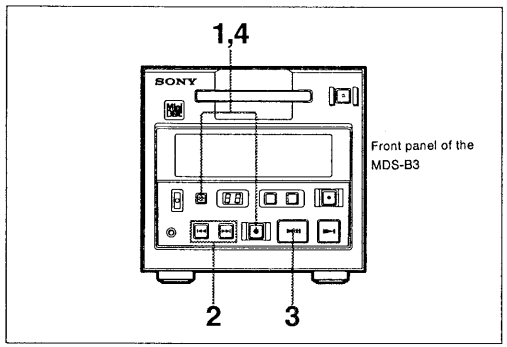
- Setting the timing of the end-of-message (EOM) indication
- Pausing before playback (AUTO PAUSE and AUTO CUE functions)
- Recording a track number automatically (LevelSync setting function (MDS-B3 only)
- Displaying the hours meter
- Selecting the input signal (MDS-B3 only)
- Setting the RS-232C interface
- Setting up for timer-activated playback

To cancel the menu

Press the STOP key.

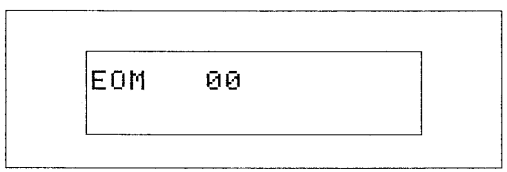
7-2 Setting the Timing of the EOM Indication

The EOM indication can be set to flash between 1 and 35 seconds before the end of a track to indicate that the end is approaching. Use the procedure below to set the timing.



Setting the timing of the end-of-message (EOM) indication

1 Press the STOP and DISPLAY keys simultaneously.
The EOM (end-of-message) function goes on.



2 Press the NEXT or PREVIOUS key to select the timing.

3 Press the PLAY/PAUSE key to enter the EOM timing.

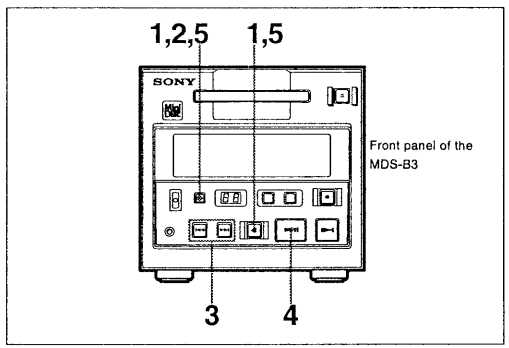
4 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

7-3 Pausing Before Playback (AUTO PAUSE and AUTO CUE Functions)

AUTO PAUSE function
When AUTO PAUSE is on, the MD recorder changes to playback pause at the start of the specified track, then starts playing the track when you press the PLAY/PAUSE key.
The AUTO PAUSE function is useful for pre-cueing tracks on multiple MD recorders during on-the-air broadcasting.

AUTO CUE function
When AUTO CUE is on, the MD recorder changes to playback pause just as the audio level rises (above –54 dB) at the start of a track. You can then play the track by pressing the PLAY/PAUSE key.
This function is useful for cueing to and delivering special sound effects during plays and other productions.

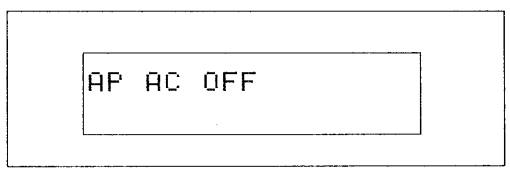
Activating the AUTO PAUSE/AUTO CUE functions



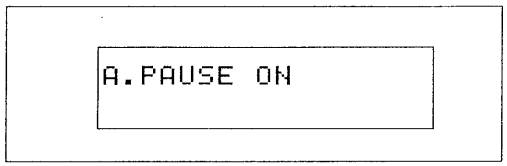
Activating the AUTO PAUSE/AUTO CUE functions

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until "AP AC OFF" appears.



3 Press the NEXT or PREVIOUS key to select the setting.
AP AC OFF: AUTO PAUSE and AUTO CUE are off.
A. PAUSE ON: AUTO PAUSE is on.
A. CUE ON: AUTO CUE is on.



4 Press the PLAY/PAUSE key to enter the selected setting.

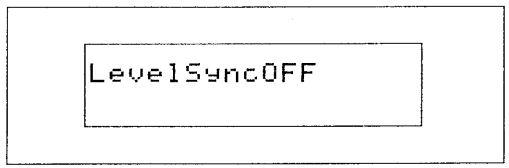
5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

7-4 Recording a Track Number Automatically (LevelSync Setting) (MDS-B3 only)

LevelSync setting is essentially the adding of track numbers at specified points while you record. This allows you to quickly locate those points later either by directly specifying the track number or by using the AMS function.
When track numbers are added automatically, the MD recorder system records track numbers whenever it detects a silent portion (i.e., the space between tracks). Manually you record track numbers by pressing the REC key during recording.
To add new track numbers to a track that has already been recorded, you must use the divide function to divide the track. See "6-3 Dividing a Recorded Track (Divide Function)" on page 6-5.

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until "LevelSyncOFF" appears.



3 Press the NEXT or PREVIOUS key to select the setting.
ON: Track marks are automatically recorded by the MD recorder system when it detects a sudden rise in audio level after a silent portion (i.e., a signal level of less than –54 dB that continues for 1.6 seconds, then jumps to –54 dB or more). The rise is taken to be the start of a new track.
OFF: A track mark is recorded when you press the REC key during MD recording.

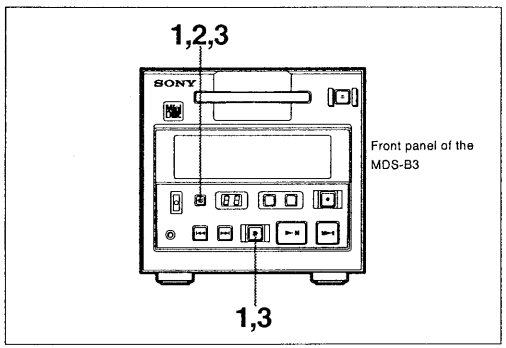
4 Press the PLAY/PAUSE key to enter the levelsync setting.

5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

Track numbers are not recorded correctly
Incorrect assignment or recording of track numbers may result when certain CDs are recorded with the "LevelSync ON" indication on.

7-5 Reading the Hours Meter

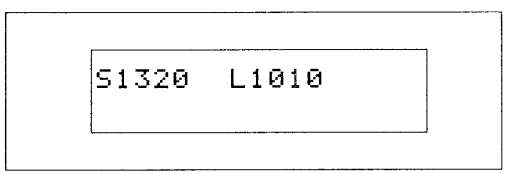
This function allows you to display the accumulated operating time of the laser diode (during recording operations) and of the spindle motor. Use this information as the basis for replacing the BU block.



Reading the hours meter

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until the hours meter showing the accumulated operating times appears.
S: Accumulated spindle motor operating time.
L: Accumulated laser diode operating time.



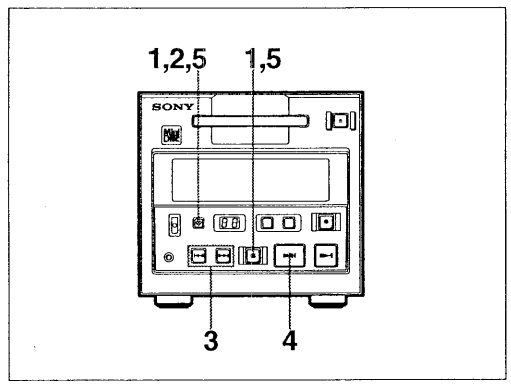
3 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

Note

When the BU block is replaced, a new EEP-ROM is installed and the hours meter is zeroed. Since this resets the other menu functions as well, you must make the applicable settings again.

7-6 Selecting the Input Signal (MDS-B3 only)

You can select either an analog signal or digital signal for input.



Selecting the input signal

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until "Digital in" or "Analog in" appears.

3 Press the NEXT or PREVIOUS key to select the input signal.
Digital in: For digital signal input. The "D.IN" indication lights.
Analog in: For analog signal input.

4 Press the PLAY/PAUSE key to enter the selected setting.

5 To continue with another menu function, press the DISPLAY key until the function appears. To cancel the menu, press the STOP key.

7-7 Setting the RS-232C Interface

External equipment connected to the RS-232C connector at the rear of the MDS-B3 can be used to control the MDS-B3. Before you can do this, however, you must use the menu-based procedures below to set the baud rate, word length, parity, and stop bit length of the RS-232C interface.

Setting the baud rate

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until the baud rate setting menu appears.

3 Press the NEXT or PREVIOUS key to select the baud rate.

1200 baud: 1200 baud rate
2400 baud: 2400 baud rate
4800 baud: 4800 baud rate
9600 baud: 9600 baud rate

4 Press the PLAY/PAUSE key to enter the selected setting.

5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

Setting the word length

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until the word length setting menu appears.

3 Press the NEXT or PREVIOUS key to select the word length.

Length 7 bits: 7-bit word length
Length 8 bits: 8-bit word length

4 Press the PLAY/PAUSE key to enter the selected setting.

5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

Setting the parity

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until the parity setting menu appears.

3 Press the NEXT or PREVIOUS key to set the parity.

Parity Off: Use no parity
Parity Even: Use even parity
Parity Odd: Use odd parity

4 Press the PLAY/PAUSE key to enter the selected setting.

5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

Setting the stop bit length

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until the stop bit length setting menu appears.

3 Press the NEXT or PREVIOUS key to select the stop bit length.

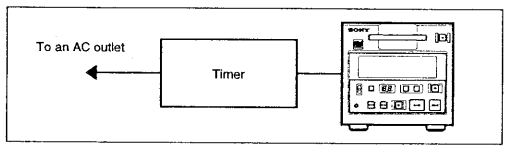
Stop bit 1: Selects a stop bit length 1
Stop bit 2: Selects a stop bit length 2

4 Press the PLAY/PAUSE to enter the selected setting.

5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

7-8 Setting Up for Timer-Activated Playback

When you set the MDS-B3 for timer-activated playback, the MDS-B3 automatically starts playback when the power is turned on. You can use this function for timer-activated playback of programs.



Connecting a timer

1 Press the STOP and DISPLAY keys simultaneously.
A menu function appears.

2 Press the DISPLAY key until the timer-activated playback setting menu appears.

3 Press the NEXT or PREVIOUS key to select the timer-activated playback setting.

T PLAY OFF: Timer-activated playback function is off.
T PLAY ON: Timer-activated playback function is on.
T PLAY RESUM: Timer-activated playback function is on and set for resume mode.
See page 7-12.

4 Press the PLAY/PAUSE key to enter the selected setting.

5 To continue with another menu function, press the DISPLAY key until the function appears.
To cancel the menu, press the STOP key.

Timer-activated playback of programs

1 Do the procedure above to set the MD recorder for timer-activated playback.

2 Create a program to be played by the timer-activated playback function.
For details on creating programs, see "5-6 Playing Back a Program (Program Play)" on page 5-12.

3 Turn the power off.
The MD recorder automatically starts playing the program the next time the power is turned on.

Notes

- Programs are saved in memory for about three days when the power is off.
- Timer-activated program playing is not possible when the resume mode (T PLAY RESUM) is selected.

Timer-activated playback in resume mode

When the MDS-B3 is set for timer-activated playback in resume mode (T PLAY RESUM), the starting position varies depending on the following conditions:

If the power is turned off in the middle of playback
The next time power is turned on, the MD recorder starts playing the track immediately after the one playing when the power was turned off.

If the power is turned off when the MD recorder is in playback pause at the start of a track
The next time power is turned on, the MD recorder resumes playback pause at the start of the same track.

The tables below show the variations in playback for different AUTO PAUSE or AUTO CUE settings.

When AUTO PAUSE or AUTO CUE is ON

Condition when the power is turned off	Condition when the power is turned on again
Playback pause at track number n	Playback pause at the start of track number n
Playback of track number n	Playback pause at the start of the track immediately after track number n

When both AUTO PAUSE and AUTO CUE are OFF

Condition when the power is turned off	Condition when the power is turned on again
Playback pause at track number n	Playback from the start of track number n
Playback of track number n	Playback from the start of the track immediately after track number n

Note

Resume mode settings are stored in memory for about three days when the power is off.

8-1 Cleaning the MD Recorder

Use a soft cloth slightly moistened with a mild detergent solution to clean the cabinet and panel surface. Do not use solvents that may damage the surface such as paint thinner, benzine, or alcohol.

8-2 Display Messages

The following table explains in the various messages that appear in the display window.

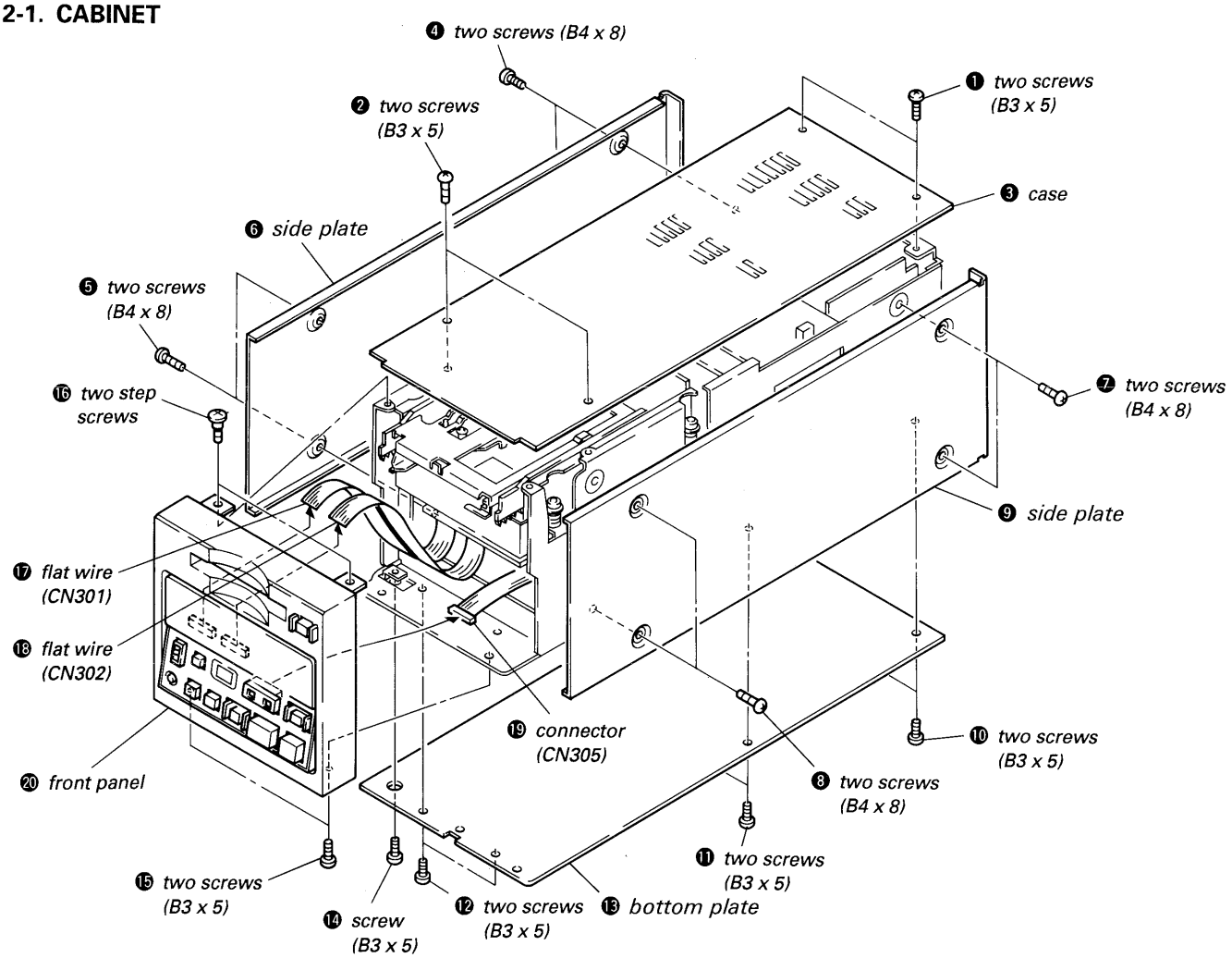
Message	Meaning
Blank Disc	A new (blank) or erased disc has been inserted.
Cannot EDIT ※	An attempt was made to edit the MD during program play, or the inserted disc contains Japanese ideograms.
Disc Error	The disc is abnormal (scratched or missing a TOC).
Disc Full ※	The disc is full.
Impossible ※	An attempt was made to combine tracks while playing back the first track.
Name Full ※	The titling capacity of the disc has reached its limit (about 1,792 characters).
No Disc	There is no disc in the unit.
No Track	The inserted disc has a disc title but no tracks.
Protected ※	The inserted disc is record-protected.
Retry ※	The first recording attempt failed due to a disturbance or scratch on the disc, and a second recording is being made.
Sorry ※	An attempt was made to combine tracks that cannot be combined.
TOC Reform? ※	The TOC has become almost full due to repeated editing operations. Press the ENTER/YES key to reform the TOC for a possible increase in recording time. Press the EDIT/NO key to bypass the reform process and turn off the message.

※ mark is the MDS-B3 only.

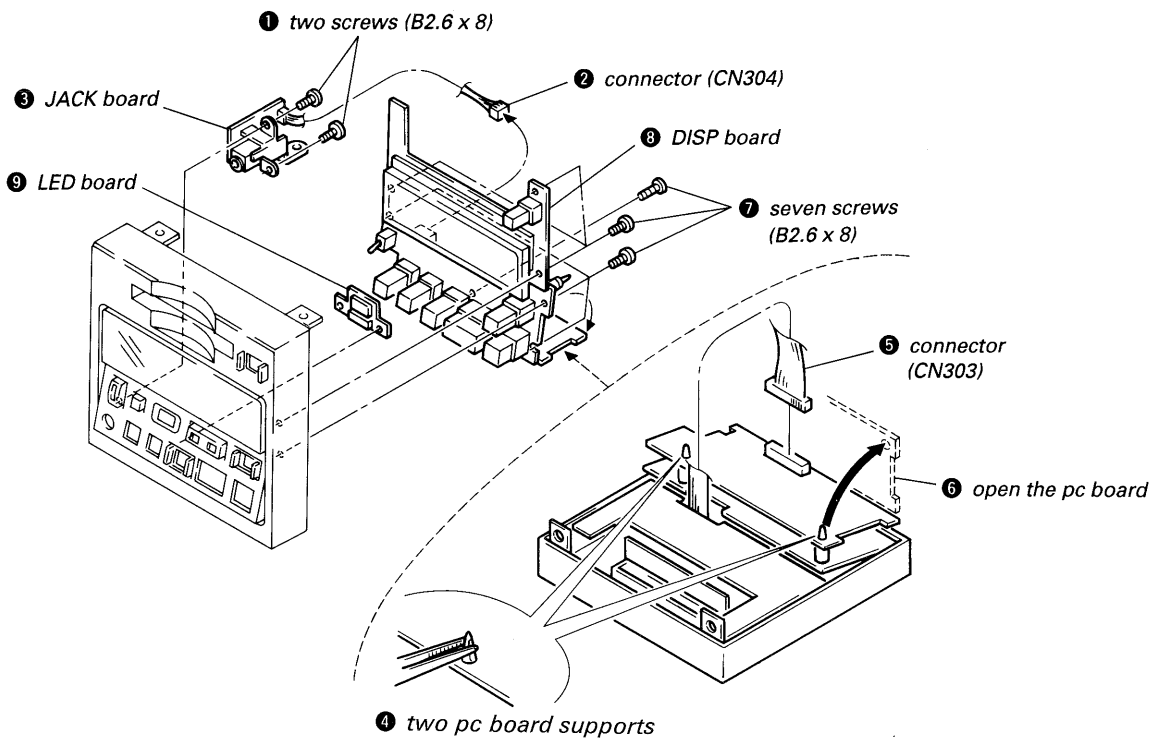
SECTION 2
DISASSEMBLY

NOTE : Follow the disassembly procedure in the numerical order given.

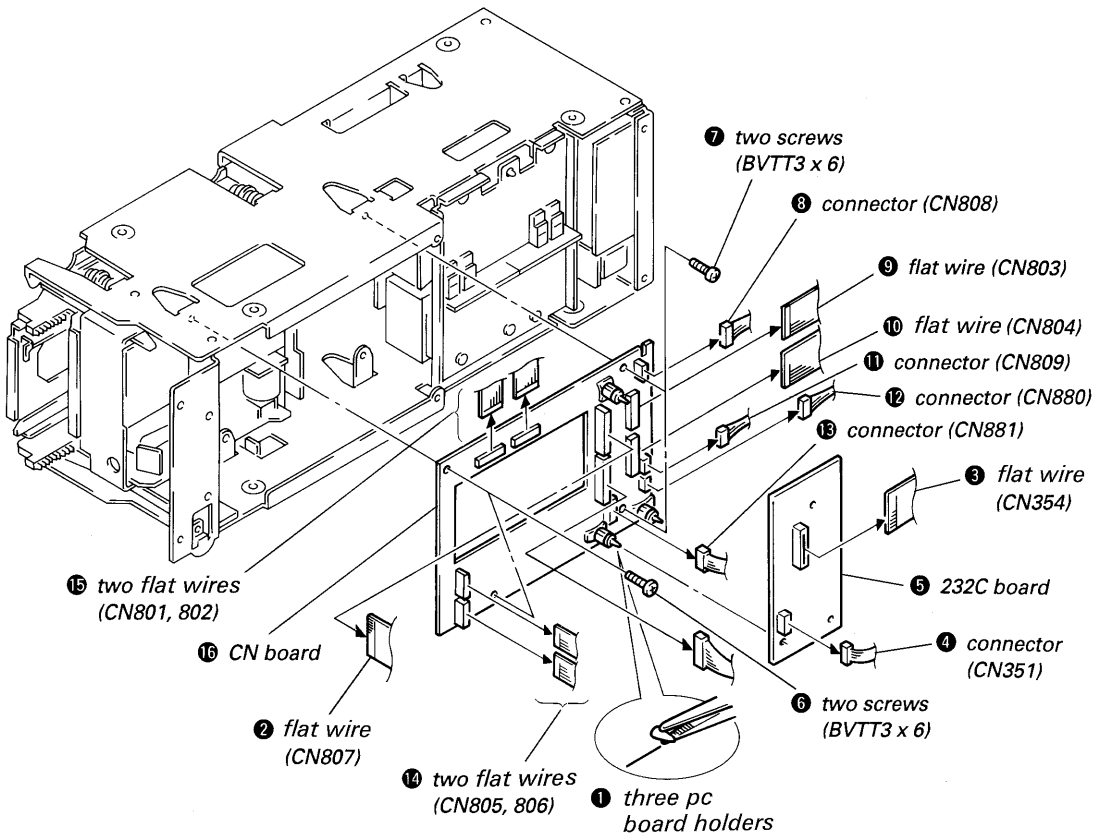
2-1. CABINET


❹ two screws (B4 x 8)
❶ two screws (B3 x 5)
❷ two screws (B3 x 5)
❸ case
❻ side plate
❺ two screws (B4 x 8)
❼ two screws (B4 x 8)
⓰ two step screws
❾ side plate
⓱ flat wire (CN301)
⓲ flat wire (CN302)
⓳ connector (CN305)
⓴ front panel
❿ two screws (B3 x 5)
❽ two screws (B4 x 8)
⓫ two screws (B3 x 5)
⓭ bottom plate
⓬ two screws (B3 x 5)
⓮ screw (B3 x 5)
⓯ two screws (B3 x 5)

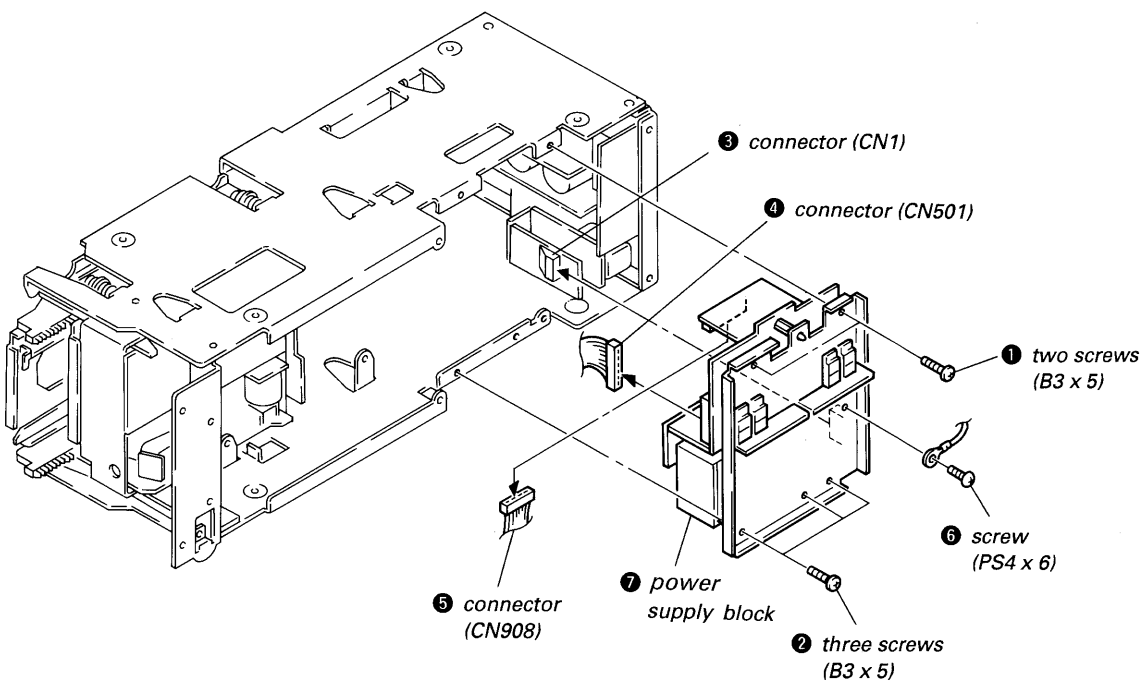
2-2. DISP BOARD, LED BOARD, JACK BOARD


❶ two screws (B2.6 x 8)
❷ connector (CN304)
❸ JACK board
❽ DISP board
❾ LED board
❼ seven screws (B2.6 x 8)
❺ connector (CN303)
❻ open the pc board
❹ two pc board supports

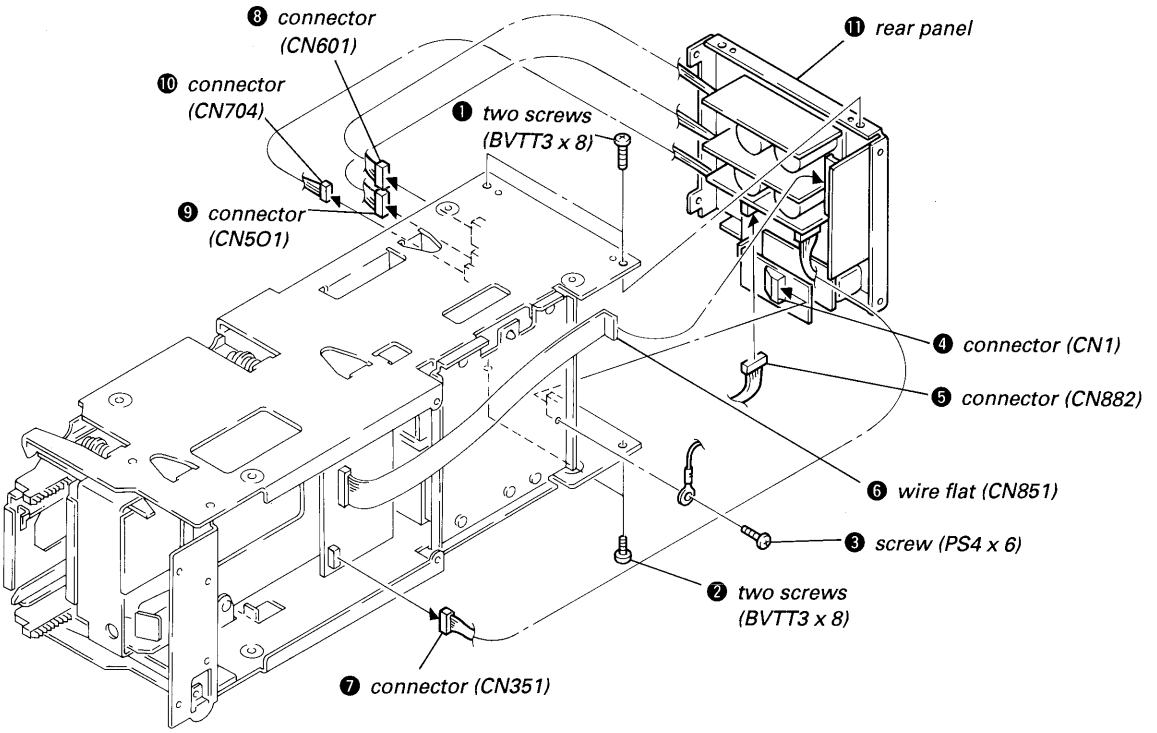
2-3. CN BOARD, 232C BOARD


❼ two screws (BVTT3 x 6)
❽ connector (CN808)
❾ flat wire (CN803)
❿ flat wire (CN804)
⓫ connector (CN809)
⓬ connector (CN880)
⓭ connector (CN881)
❸ flat wire (CN354)
❺ 232C board
❹ connector (CN351)
❻ two screws (BVTT3 x 6)
⓯ two flat wires (CN801, 802)
⓰ CN board
❷ flat wire (CN807)
⓮ two flat wires (CN805, 806)
❶ three pc board holders

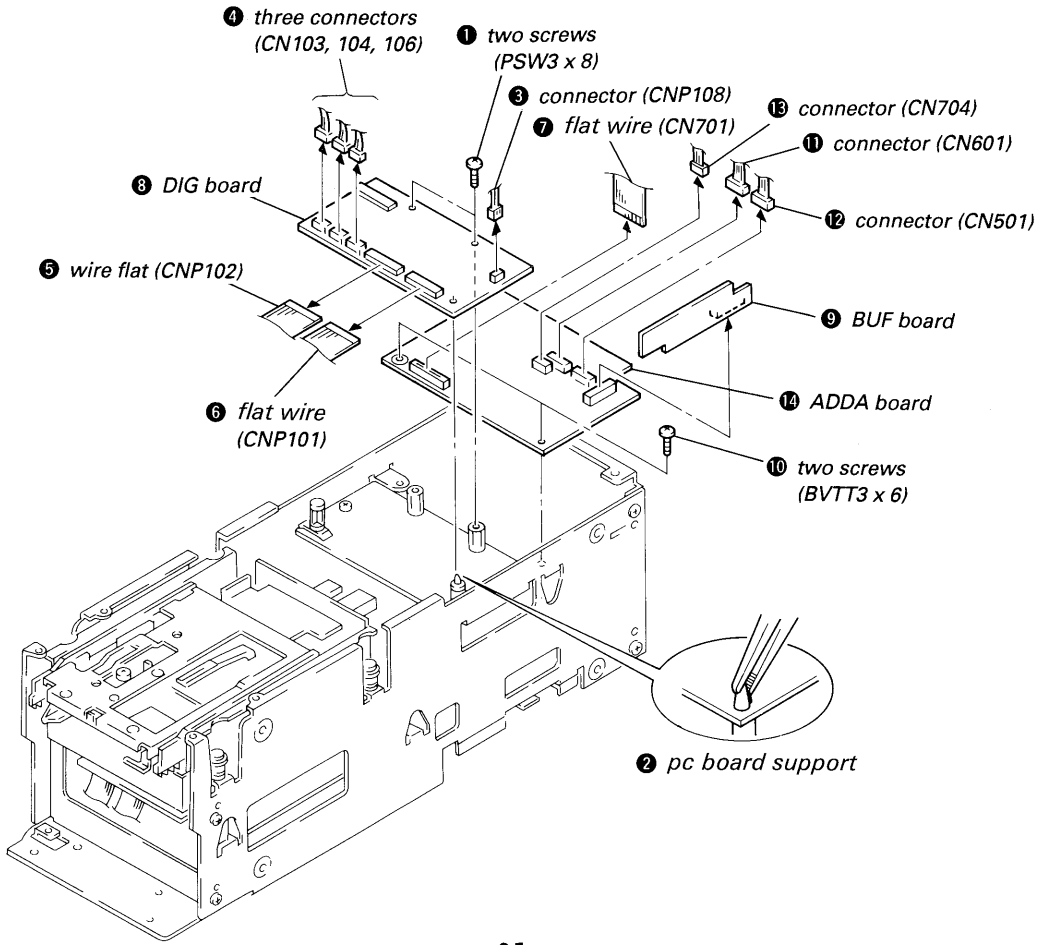
2-4. POWER SUPPLY BLOCK


❸ connector (CN1)
❹ connector (CN501)
❶ two screws (B3 x 5)
❻ screw (PS4 x 6)
❺ connector (CN908)
❼ power supply block
❷ three screws (B3 x 5)

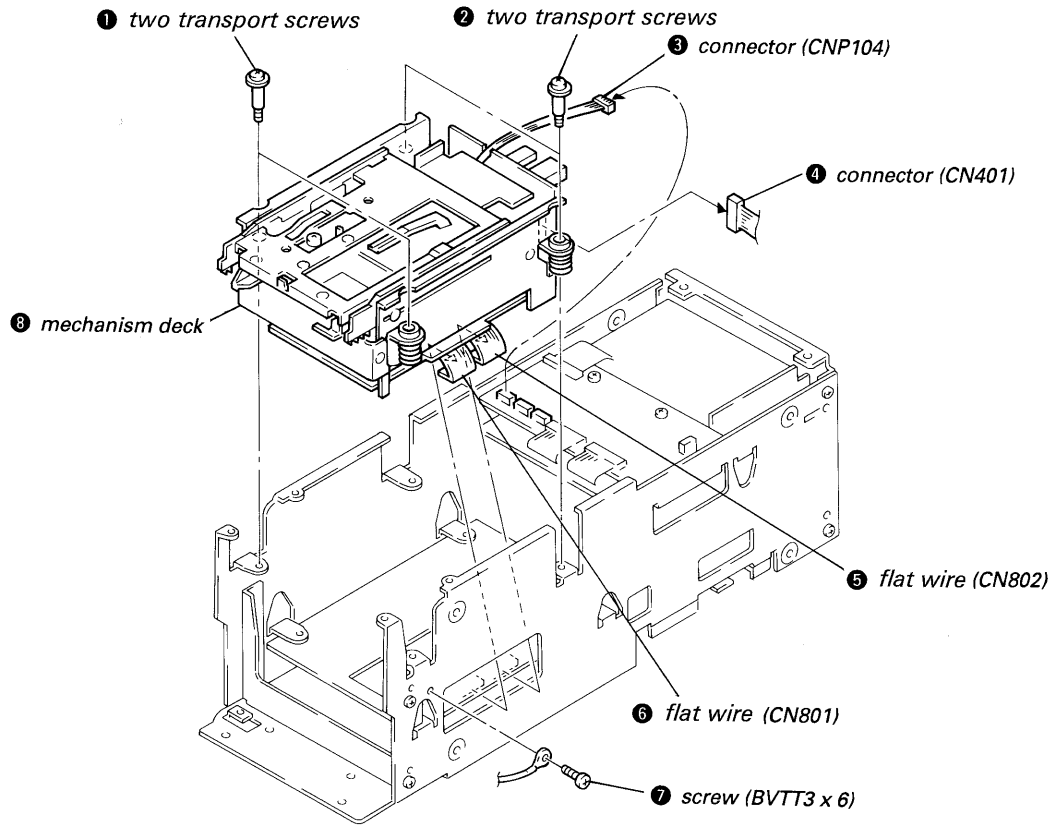
2-5. REAR PANEL



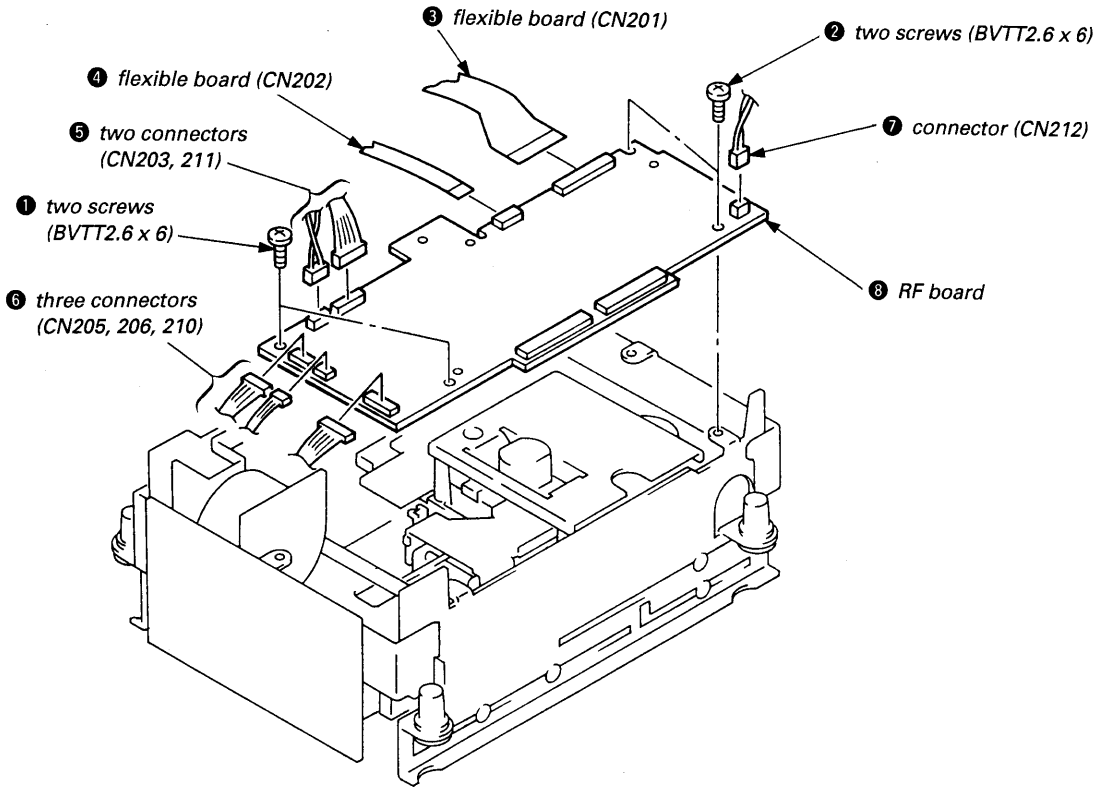
2-6. DIG BOARD, ADDA BOARD, BUF BOARD



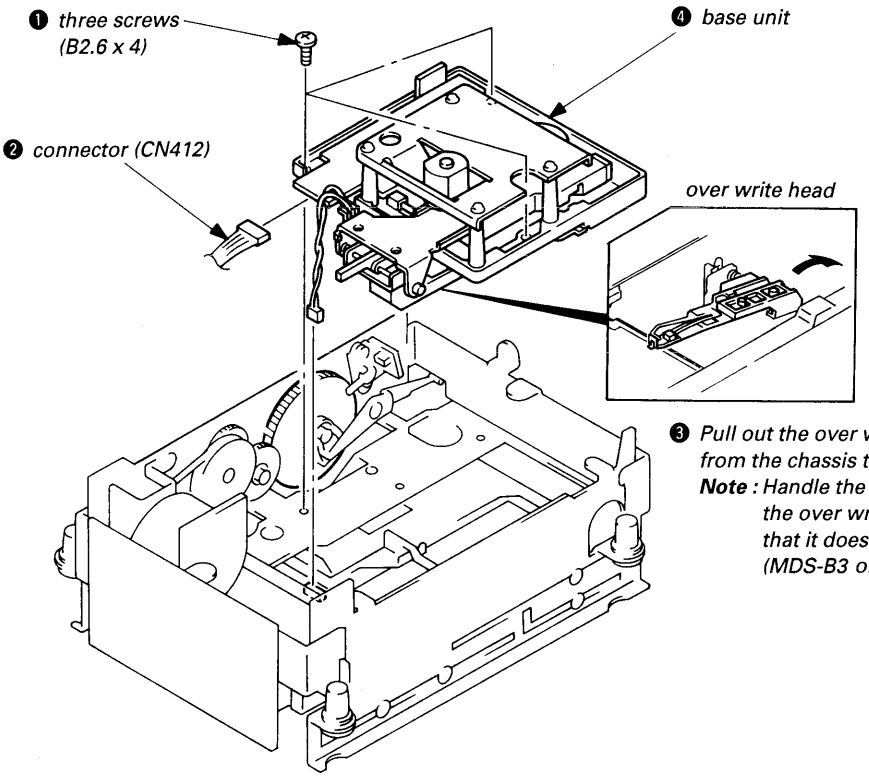
2-7. MECHANISM DECK



2-8. RF BOARD

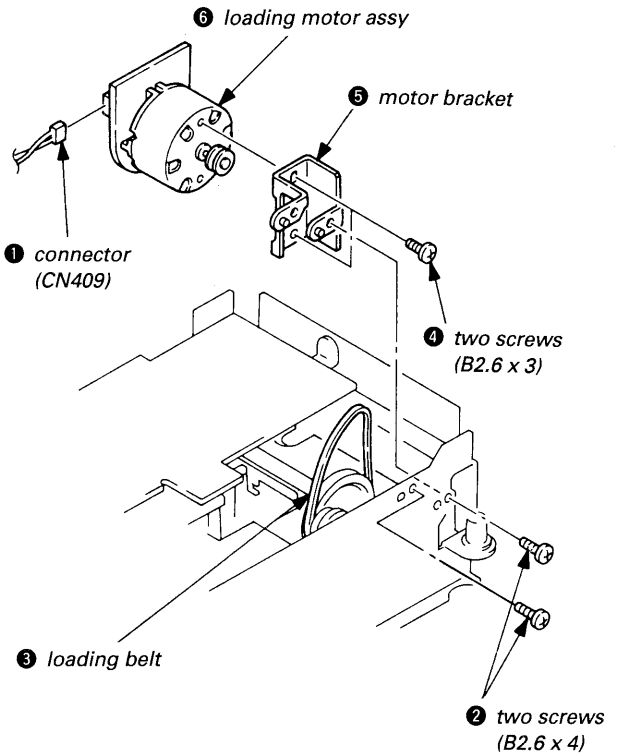

❸ flexible board (CN201)
❷ two screws (BVTT2.6 x 6)
❹ flexible board (CN202)
❺ two connectors (CN203, 211)
❼ connector (CN212)
❶ two screws (BVTT2.6 x 6)
❽ RF board
❻ three connectors (CN205, 206, 210)

2-9. BASE UNIT

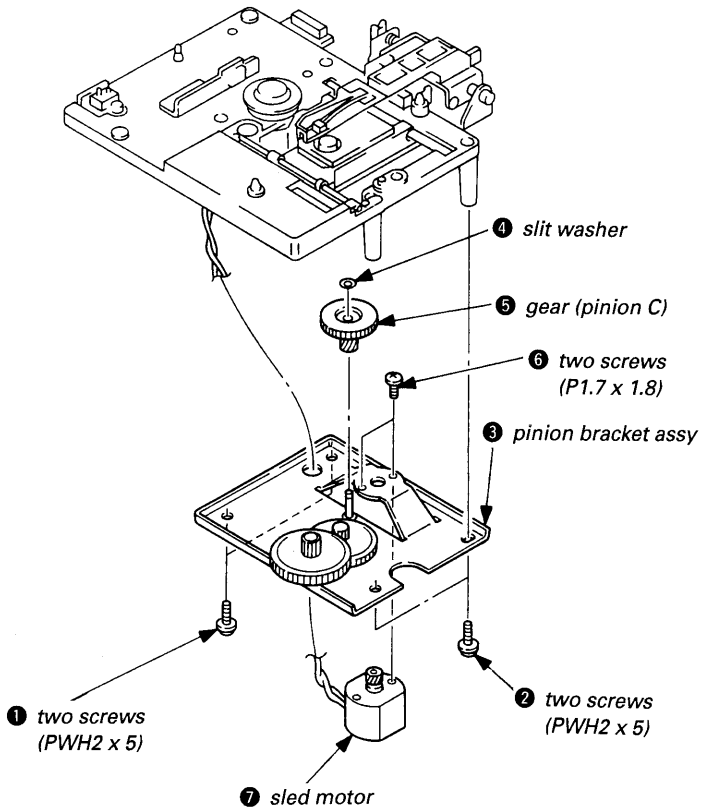


❸ *Pull out the over write head section from the chassis to remove.*
***Note** : Handle the magnetic head section of the over write head section carefully so that it does not change it's shape, etc. (MDS-B3 only)*

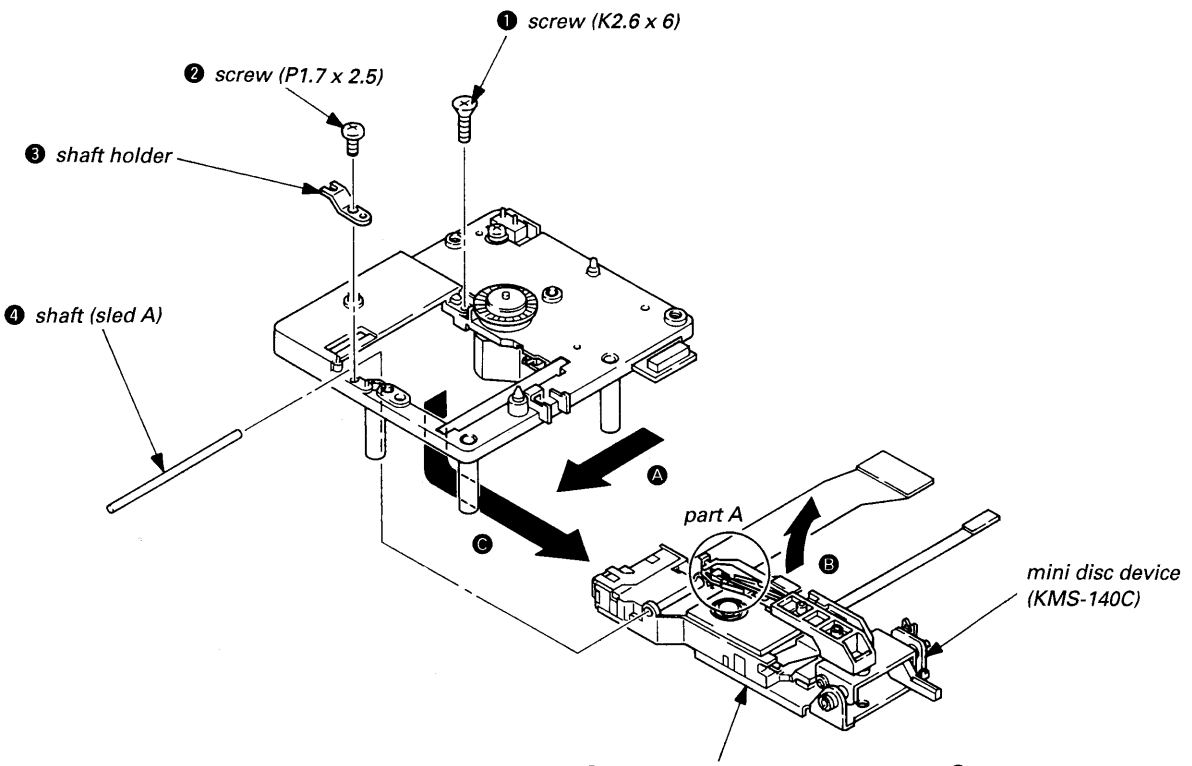
2-10. LOADING MOTOR ASSY



2-11. SLED MOTOR



2-12. MINI DISC DEVICE (KMS-140C)



❺ Slide the device in arrow direction Ⓐ.
❻ Lift up the over write head section slightly in arrow direction Ⓑ and remove the mini disc device in arrow direction Ⓒ.
Note : Handle the magnetic head section (Part A) of the over write head section carefully so that it does not change its shape, etc.

SECTION 3
TEST MODE

3-1. TEST MODE SETTING

Keep pressing the PLAY/PAUSE ▶II key and the CUE/STDBY I▶I key until 「CHEC」 is displayed. When 「CHEC」 is displayed, connect the power cord to the AC outlet, then release the PLAY/PAUSE ▶II key and the CUE/STDBY I▶I key.

3-2. TEST MODE RELEASING

Disconnect the power cord from the AC outlet.

3-3. TEST MODE OPERATION

[ ] represents main operations by each key.

Note 1 : When a disc is ejected, the LED in EJECT ⏏ key continues flickering.

Note 2 : Do not connect the remote commander (RM-DC1) in the TEST mode.

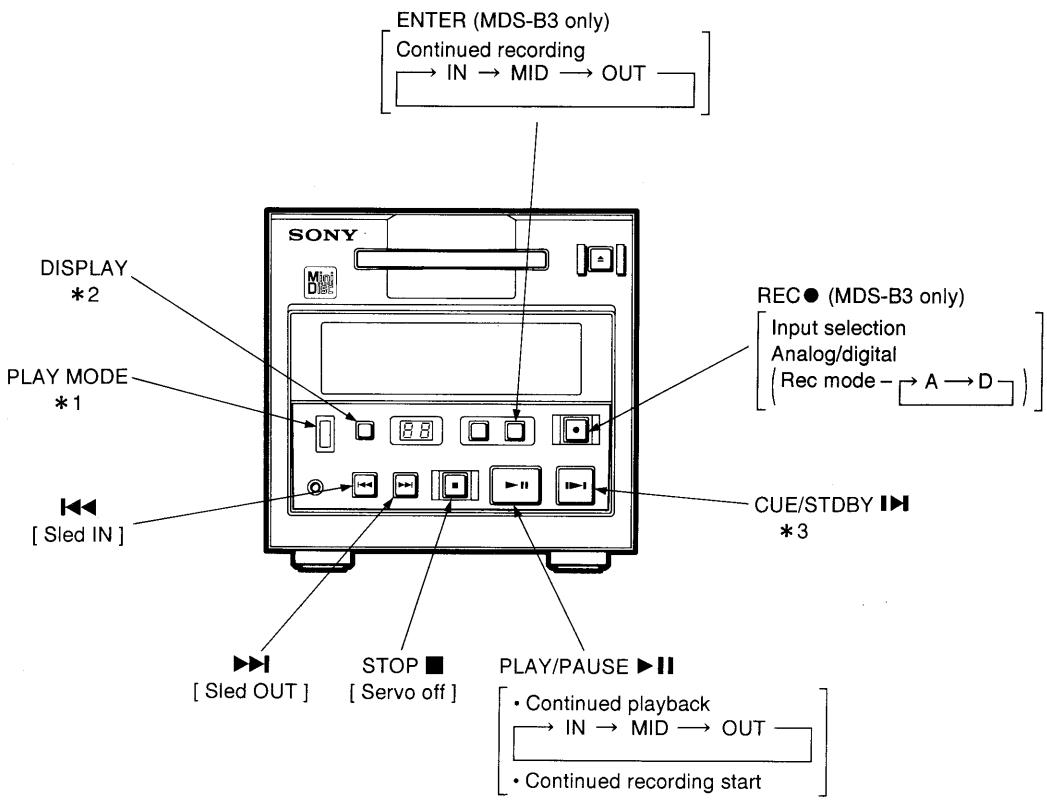


Fig. 3-1. Key arrangement

KEY \ MODE	*1 Play mode switch of the conditions.		
	REPEAT ALL	OFF	REPEAT 1
*2 DISPLAY	[Focus servo on]	Laser power selection → 0C → 16 → 6F → E5	Tracking servo gain → LOW → HIGH
*3 CUE/STDBY I▶I	Focus servo and CLV servo on	RF mode selection → MO → CD → MO Pit	All servos on CLV servo → A → S

Table 3-1. Key arrangement

Key	Indication	Contents	Remarks
ENTER	CREC-IN	Continued recording on inner circumference	• Indication changes as key is pressed. • After the indication shown in the left has appeared, repeated recording occurs at the indicated position by pressing ►II key. • To stop recording, press ■ key.
	CREC-MIDDLE	Continued recording on middle circumference	
	CREC-OUT	Continued recording on outer circumference	
DISPLAY *1	Laser Power 0C	CD reading power	• Indication changes as key is pressed, laser power is switched and laser is emitted. • To stop the laser emission, press ■ key.
	Laser Power 16	MO reading power	
	Laser Power 6F	Laser power adjustment (3.5mW)	
	Laser Power E5	MO writing power (maximum generating power)	
DISPLAY *2	Trk Gain Hi	Tracking servo gain UP	• Indication changes as key is pressed, and the tracking servo gain is selected. • Normally low.
	Trk Gain Low	Tracking servo gain NORMAL	
CUE/ STDBY ▮►▮ *1	RF mod=MO	RF mode : MO groove	Adjusted on the MO disc groove. • Indication changes as key is pressed, and the RF mode is selected.
	RF mod=CD	RF mode : CD	Adjusted on the CD disc.
	RF mod=MO pit	RF mode : MO pit	Adjusted on the MO disc pit.
EJECT ▲	OPEN	Disc ejection	
	CLOSE	Disc loading	
REC ●	Rec mode-A	Operation mode of CXD2525R : analog	PLL master mode • Indication changes as key is pressed, and the input is selected. (analog/digital)
	Rec mode-D	Operation mode of CXD2525R : digital	PLL slave mode
▮◄◄	sled in	Sled is moved toward inner circumference.	• Sled moves during key is pressed, and stops when key is released.
►►▮	sled out	Sled is moved toward outer circumference.	
DISPLAY *3	Fcs on	Focus servo on	• Only focus servo is on by pressing key.
CUE/STDBY ▮►▮ *3	Fcs ClvS on	Focus / spindle (S) servo on, tracking servo off.	• Focus servo and spindle servo (S) are on by pressing key.
CUE/STDBY ▮►▮ *2	Fcs ClvATr on	Focus / spindle (A) / tracking servo on	• Indication changes as key is pressed, and each servo is on.
	Fcs ClvSTr on	Focus / spindle (S) / tracking servo on	
PLAY/ PAUSE ►II	C PLAY IN	Continued playback of inner circumference	• Indication changes as key is pressed, repeated recording occurs at the indicated position. • To stop the playback, press ■ key.
	C PLAY MID	Continued playback of middle circumference	
	C PALY OUT	Continued playback of outer circumference	
STOP ■	—	All servos off	

Table 3-2. Test mode operation

NOTE:
*1 : Play mode switch of the OFF conditions.
*2 : Play mode switch of the REPEAT 1 conditions.
*3 : Play mode switch of the REPEAT ALL conditions.

SECTION 4
ELECTRICAL ADJUSTMENTS

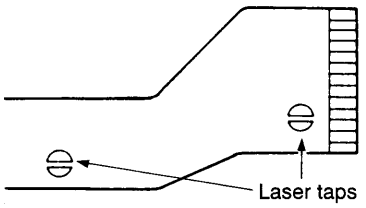
4-1. CAUTION ON LASER DIODE EMITTING CONFIRMATION

Never look the laser diode emission from right above when adjusting. It may cause loss of eyesight.

4-2. NOTE ON MINI DISC DEVICE (KMS-140C) HANDLING

The laser diode within the optical pickup is extremely subjected to electrostatic destruction. So, the laser tap on the flexible board should be bridge soldering when handling. Connect the solder bridge before disconnecting the connector. Also, do not remove the solder bridge befor connecting the connector.

There are two laser taps, and use a preferable one. Furthermore, take fully measurements against the electrostatic destruction. Take care of handling the flexible board because it can be damaged.



Optical pickup flexible board

After replacing the MiniDisc device, perform adjustment and confirmation as follows.

- Temperature compensation offset adjustment
- Laser power adjustment
- MO groove traverse adjustment
- E-F balance adjustment
- MO pit traverse adjustment
- CD RF level adjustment
- CD traverse adjustment
- Error rate confirmation

4-3. NOTE ON ADJUSTMENT

1) Perform adjustment in the test mode.
   Release the test mode after adjustment.
2) Adjustment should be performed in order described.
3) Use jigs and measurement tools described below.

- CD test disc TGYS-1 (Part No.: 4-959-188-01)
- Laser power meter LPM-8001 (Part No.: J-2501-046-A)
- Error rate counter MDPE-1 (Part No.: J-2501-047-A)
- Oscilloscope (band more than 40 MΩ, Calibrate the probe before performing the measurement.)
- Digital voltmeter
- Temperature meter

4-4. MO CONTINUED RECORDED DISC MAKING

- This disc is used for MO Focus Bias Adjustment and MO Error Rate Confirmation.
  The following provides how to make the MO continued recorded disc.

1. Insert a standard product MO disc (blank disc).
2. Play mode switch of the OFF conditions.
3. Press the CUE/STDBY ⏮⏯ key to let "RF mod=MO" appear. (RF mode : MO groove)
4. Press the ⏭ key to move the optical pickup from pit to outer circumference.
5. Press the ENTER key to let "CREC-MIDDLE" appear. (middle circumference continued recording)
6. Press the PLAY/PAUSE ⏯ key to start recording. (End the recording within five minutes.)
7. Press the STOP ■ key to stop the recording.
8. Press the EJECT ⏏ key to take out the MO disc.

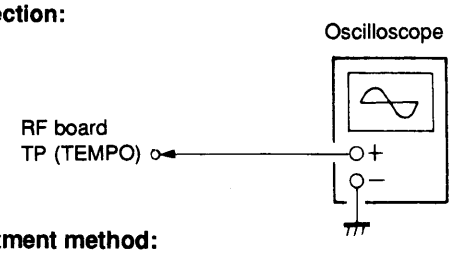
Performing these steps described above permits continued recorded disc for MO focus bias adjustment and MO error rate confirmation.

4-5. OFFSET ADJUSTMENT

Note: This adjustment should be performed immediately after setting the test mode. Performing other adjustments switch the operation mode, and the correct adjustment can not be performed. (Refer to "SECTION 3 TEST MODE".)

1) Temperature compensation offset adjustment

Connection:



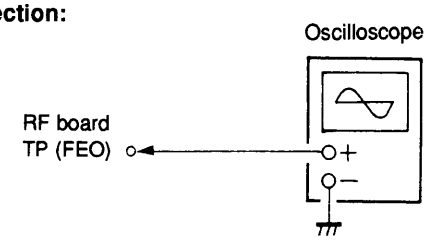
Adjustment method:

1. Connect the oscilloscope to TP (TEMPO) on the RF board.
2. Adjust RV205 on the RF board so that the reading on the oscilloscope meets the specification.

Specification: 0±50mV (25°C)
+27mV/°C (Increased by 27mV with every increasing temperature by 1°C)

2) Focus bias offset adjustment

Connection:

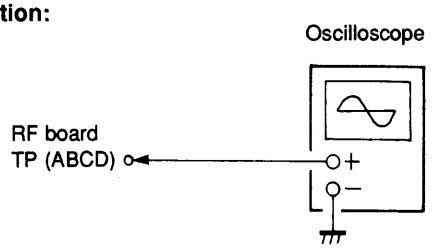


Adjustment method:

1. Connect the oscilloscope to TP (FEO) on the RF board.
2. Adjust RV208 on the RF board so that the reading on the oscilloscope becomes 0±20mV.

3) FOK offset adjustment

Connection:

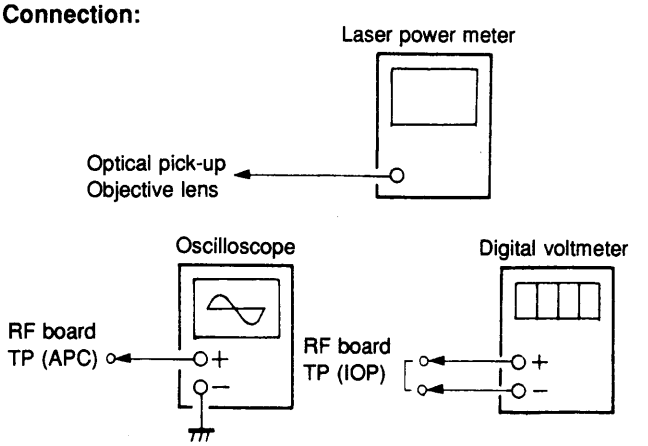


Adjustment method:

1. Connect the oscilloscope to TP (ABCD) (IC209㉝) on the RF board.
2. Adjust RV207 on the RF board so that the reading on the oscilloscope becomes 0±20mV.

4-6. LASER POWER ADJUSTMENT

Connection:



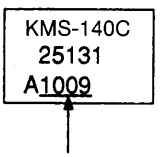
Adjustment method:

1. Place the laser power meter on the objective lens of the optical pickup. (If setting can not be made correctly, move the optical pickup using the ▶▶| or |◀◀ key.)
   Connect the oscilloscope to TP (APC) on the RF board, the digital voltmeter to TP (IOP) respectively.
2. Play mode switch of the OFF conditions.
3. Press the DISPLAY key to let "Laser Power 6F" appear. (laser power : for adjustment)
4. Adjust RV204 on the RF board so that the reading on the laser power meter becomes 3.6±0.1mW.
   At this time, confirm that the reading on the oscilloscope is 1.5±0.1V.
5. Play mode switch of the OFF conditions.
6. Press the DISPLAY key to let "Laser Power E5" appear. (laser power : MO writing)
7. At this time, confirm that the reading on the laser power meter, oscilloscope and digital voltmeter meet the specifications shown below.

Specifications:

Laser power meter : $7.0\ ^{+0}_{-0.4}$ mW
Oscilloscope: 3.0±0.1V
Digital voltmeter: Optical pickup reading ±5mA

(Optical pickup label)



In this case : Iop=100.9mA
Iop (mA)=Digital voltmeter reading (mV) / 1(Ω)

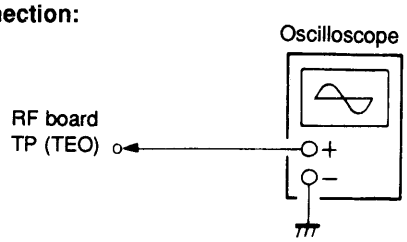
8. Play mode switch of the OFF conditions.
9. Press the DISPLAY key to let "Laser Power 16" appear. (laser power : MO reading)
10. At this time, confirm that the reading on the laser power meter and oscilloscope become the specifications shown below.

Specifications:
Laser power meter : 0.85±0.04mW
Oscilloscope : 0.37±0.1V

11. Press the STOP■ key to stop the laser emitting.

4-7. MO TRAVERSE ADJUSTMENT

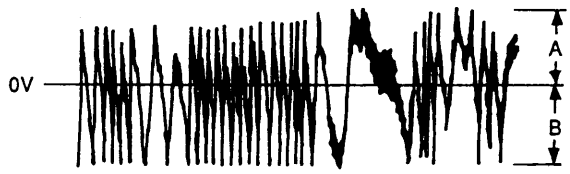
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (TEO) on the RF board.
2. Insert a MO disc (standard product).
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ⏯ key to let "RF mod=MO" appear. (RF mode : MO groove)
5. Move the optical pickup from pit to outer circumference by pressing the ⏮ or ⏭ key.
6. Play mode switch of the REPEAT ALL conditions.
7. Press the CUE/STDBY ⏯ key. (Focus / spindle (S) servo on, tracking servo off)
8. Adjust the RV201 on the RF board so that the waveform of the oscilloscope meets the specification. (MO groove traverse adjustment)

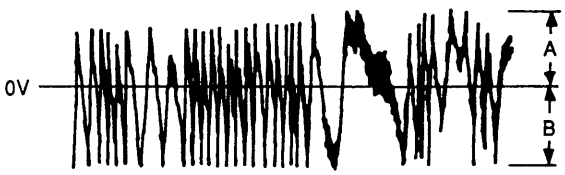
(Traverse waveform)



Specification: A=B

9. Play mode switch of the OFF conditions.
10. Press the DISPLAY key to let "Laser Power E5" appear. (laser power : MO writing)
11. Adjust the RV209 on the RF board so that the waveform of the oscilloscope meets the specification. (E-F balance adjustment)

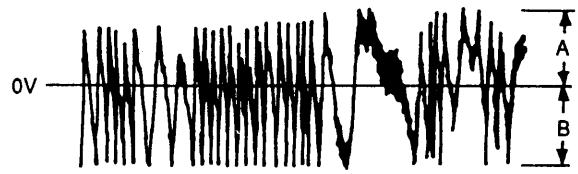
(Traverse waveform)



Specification: A=B

12. Play mode switch of the OFF conditions.
13. Press the DISPLAY key to let "Laser Power 16" and "Laser Power E5" appear alternatively, and repeat adjustment until both offset values meet the specifications.
14. Press the STOP ■ key.
15. Move the optical pickup to the pit portion (inner most circumference) by pressing ⏮ key.
16. Play mode switch of the OFF conditions.
17. Press the CUE/STDBY ⏯ key to let "RF mod=MOpit" appear. (RF mode : MO Pit)
18. Play mode switch of the REPEAT ALL conditions.
19. Press the CUE/STDBY ⏯ key. (Focus/spindle (S) servo on, tracking servo off)
20. Adjust the RV202 on the RF board so that the waveform of the oscilloscope meets the specification. (MO pit traverse adjustment)

(Traverse waveform)

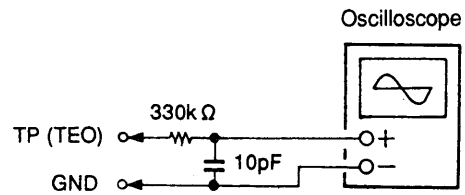


Specification: A=B

21. Press the STOP ■ key.
22. Press the EJECT ⏏ key to take out the MO disc.

Note 1: If a recorded disc is used for this adjustment, the data is erased when MO writing.

Note 2: If it is hard to observe the traverse waveform, connect the oscilloscope as shown below. The appearance is improved.

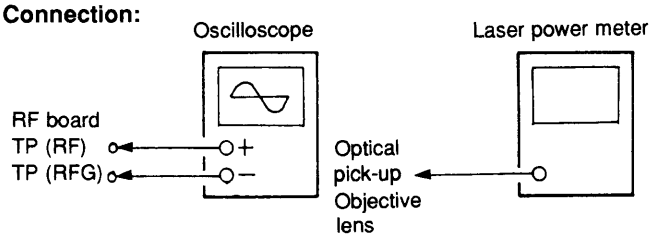


4-8. CD RF LEVEL ADJUSTMENT

Condition:

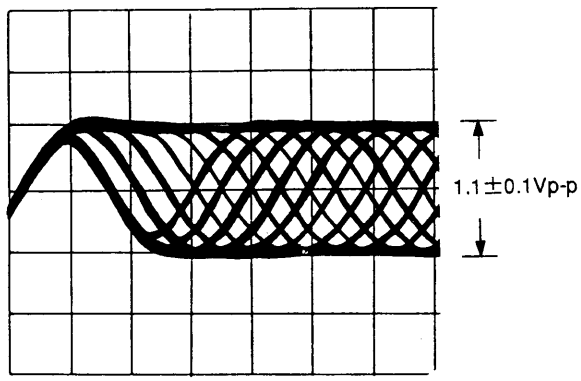
Perform adjustment in the condition where the unit is in horizontal.

Connection:



Adjustment method:

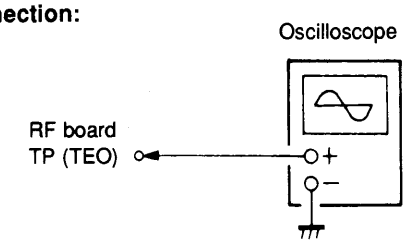
1. Connect the Oscilloscope to TP (RF) and TP (RFG) on the RF board.
2. Insert the test disc TGYS-1.
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ⏭ key to let "RF mod=CD" appear. (RF mode : CD)
5. Press the PLAY/PAUSE ▶❚❚ key to perform repeated playback.
6. Adjust the RV215 on the RF board so that the RF level of the oscilloscope becomes 1.1±0.1Vp-p.



7. Press the STOP ■ key to stop playback.
8. Press the EJECT ⏏ key to take out the test disc.
9. Place the laser power meter on the objective lens of the optical pickup. (If setting can not be made correctly, move the optical pickup using ⏭ or ⏮ key.)
10. Play mode switch of the OFF conditions.
11. Press the DISPLAY key to let "Laser Power 0C" appear. (laser power : CD reading)
12. Confirm that the reading of the laser power meter is 0.49±0.06mW.
13. Press the STOP ■ key to stop laser diode emitting.

4-9. CD TRAVERSE ADJUSTMENT

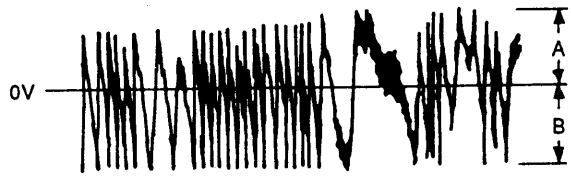
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (TEO) on the RF board.
2. Insert the test disc TGYS-1.
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ⏭ key to let "RF mod=CD" appear. (RF mode : CD)
5. Play mode switch of the REPEAT ALL conditions.
6. Press the CUE/STDBY ⏭ key. (Focus/spindle (S) servo on, tracking servo off)
7. Adjust the RV203 on RF board so that the reading on the oscilloscope meets the specification.

(Traverse waveform)



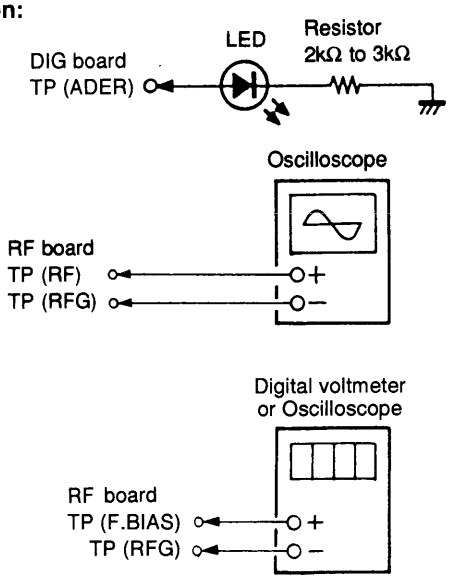
Specification: A=B

8. Press the STOP ■ key.
9. Press the EJECT ⏏ key to take out the test disc.

4-10. MO FOCUS BIAS ADJUSTMENT

● Method by means of RF and ADER

Connection:

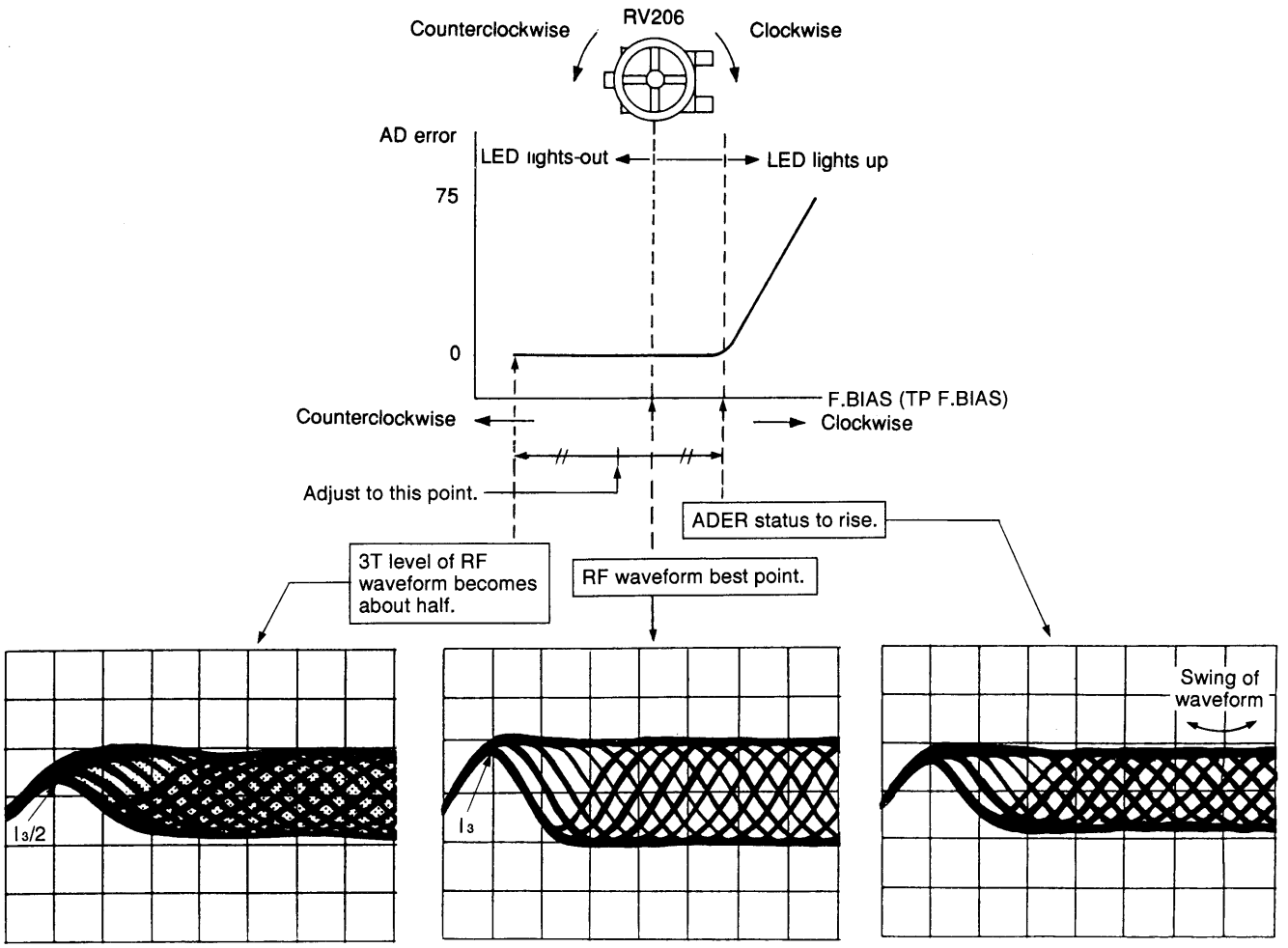


Adjustment method:

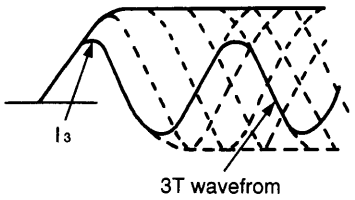
1. Connect the LED and resistor (2k to 3kΩ) to TP (ADER) on the DIG board. (Oscilloscope can be connected. "H" if error is present.)
2. Connect the Oscilloscope to TP (RF) and TP (RFG) on the RF board, and also connect the digital voltmeter or oscilloscope to TP (F.BIAS) and TP (RFG).
3. Insert the continued recorded disc. (Refer to "4-4. MO CONTINUED RECORDED DISC MAKING".)
4. Move the optical pickup toward outside for 1 or 2 seconds to exit from the P-TOC area.
5. Play mode switch of the OFF conditions.
6. Press the CUE/STDBY ⏭ key to let "RF mod=MO" appear. (RF mode : MO groove)
7. Press the PLAY/PAUSE ▶❚❚ key to let "C PLAY MID" appear. (middle circumference repeated playback)
8. Adjust the RV206 on the RF board so that the eye-pattern of the oscilloscope correctly appears. At this time, take a note of I_3 level (3T waveform).

   (The correct eye-pattern means that ◇ shape can be identified clearly at the center of waveform.)

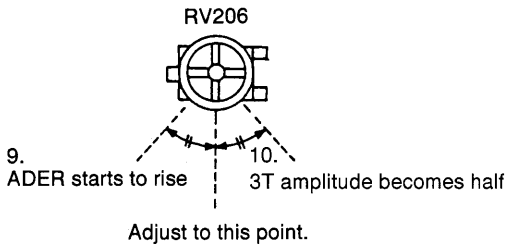
Normally, a relation between the RF waveform and AD error is as follows.



3T wavefrom



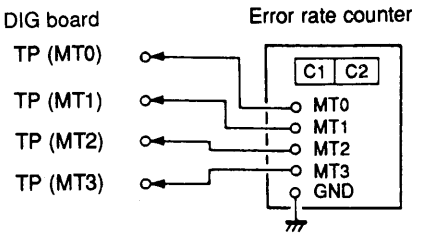
9. Observing the LED and RF waveform on oscilloscope connected to the DIG board, rotate RV206 clockwise, and take a note of voltage at TP (F.BIAS) or mechanical position of RV206 when the ADER starts to rise (LED starts to blink).
10. Observing the RF waveform on oscilloscope, rotate RV206 counterclockwise, and take a note of voltage at TP (F.BIAS) or mechanical position of RV206 when the I3 level of 3T waveform recorded in step 8 becomes about half.
11. Adjust RV206 to attain center of voltage or mechanical center of those recorded in steps 9 and 10. (See Figure below.)



12. Press the STOP ■ key to stop the playback.
13. Press the EJECT ⏏ key to take out the continued recorded disc.

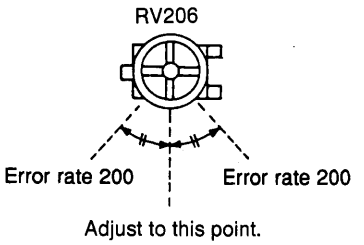
● Method requiring error rate counter

Connection:



Adjustment method:

1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIG board.
2. Insert the continued recorded disc. (Refer to "4-4. MO CONTINUED RECORDED DISC MAKING".)
3. Move the optical pickup toward outside for 1 or 2 seconds to exit from the TOC area.
4. Play mode switch of the OFF conditions.
5. Press the CUE/STDBY ⏯ key to let "RF mod=MO" appear. (RF mode : MO)
6. Press the PLAY/PAUSE ▶❚❚ key to let "C PLAY MID" appear. (middle circumference repeated playback)
7. Turn the RV206 on the RF board so that the error rate (C1) of the error rate counter becomes 200 at two points. Measure these two points and adjust the RV206 to the mechanical center.

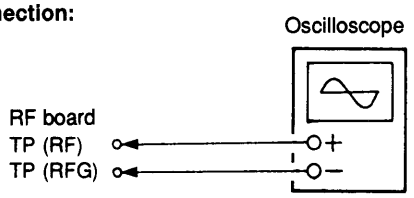


8. Press the STOP ■ key to stop the playback.
9. Press the EJECT ⏏ key to take out the continued recorded disc.

4-11. CD FOCUS BIAS ADJUSTMENT

● Method requiring no error rate counter

Connection:

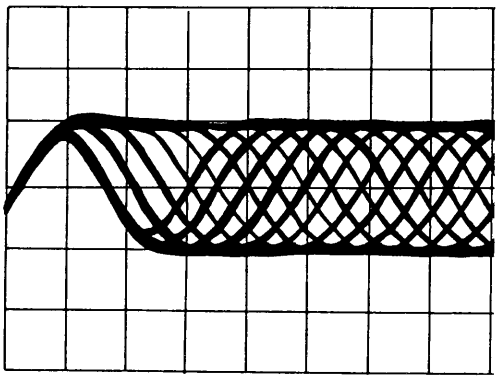


Adjustment method:

1. Connect the Oscilloscope to TP (RF) and TP (RFG) on the RF board.
2. Insert the test disc TGYS-1.
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ▮▶▮ key to let "RF mod=CD" appear. (RF mode : CD)
5. Press the PLAY/PAUSE ▶▮▮ key to perform repeated playback.
6. Adjust the RV212 on the RF board so that the eye-pattern of the oscilloscope correctly appears.

   The correct eye-pattern means that ◇ shape can be identified clearly at the center of waveform.

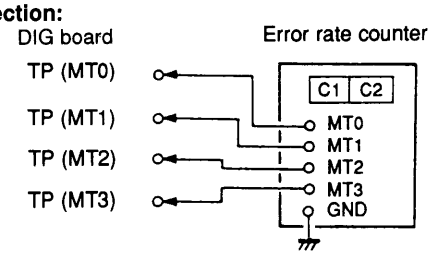
An example of RF waveform



7. Press the STOP ■ key to stop the playback.
8. Press the EJECT ⏏ key to take out the test disc.

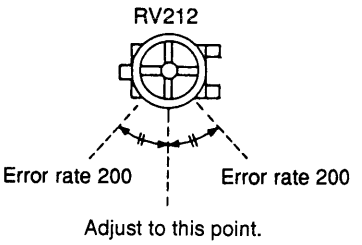
● Method requiring error rate counter

Connection:



Adjustment method:

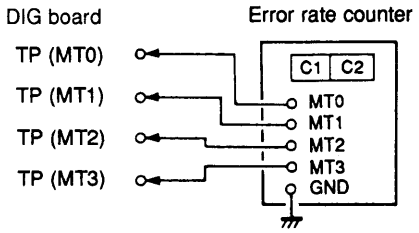
1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIG board.
2. Insert the test disc TGYS-1.
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ▮▶▮ key to let "RF mod=CD" appear. (RF mode : CD)
5. Press the PLAY/PAUSE ▶▮▮ key to let "C PLAY MID" appear. (middle circumference repeated playback)
6. Turn the RV212 on the RF board so that the error rate (C1) of the error rate counter becomes 200 at two points. Measure these two points and adjust the RV212 to the mechanical center.



7. Press the STOP ■ key to stop the playback.
8. Press the EJECT ⏏ key to take out the test disc.

4-12. ERROR RATE CONFIRMATION

Connection:



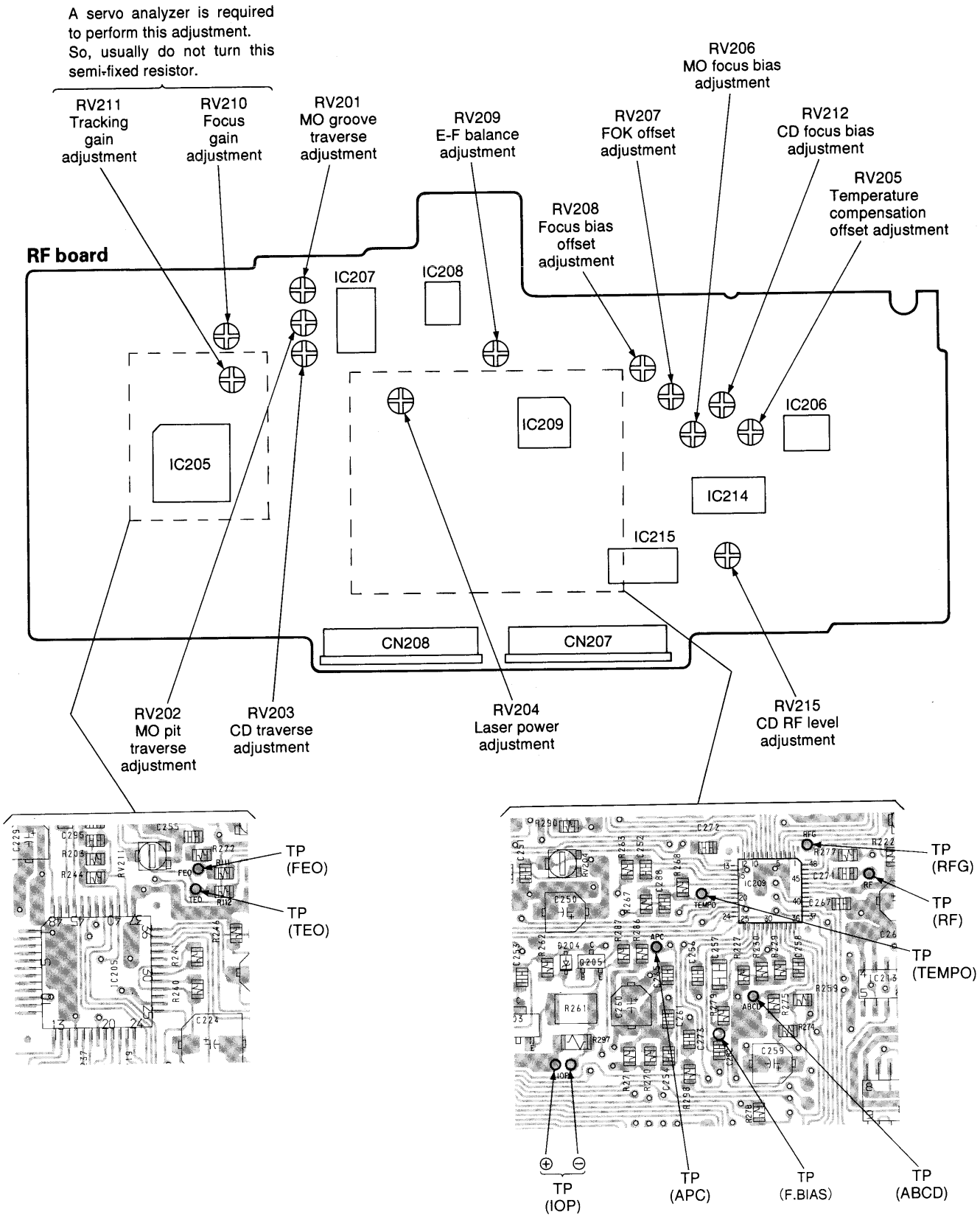
CD error rate confirmation:

1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIG board.
2. Insert the test disc TGYS-1.
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ⏭ key to let "RF mod=CD" appear. (RF mode : CD)
5. Press the PLAY/PAUSE ▶❚❚ key to let "C PLAY MID" appear. (middle circumference repeated playback)
6. Confirm that the error rate (C1) of the error rate counter is less than 20.
7. Press the STOP ■ key to stop the playback.
8. Press the EJECT ⏏ key to take out the test disc.

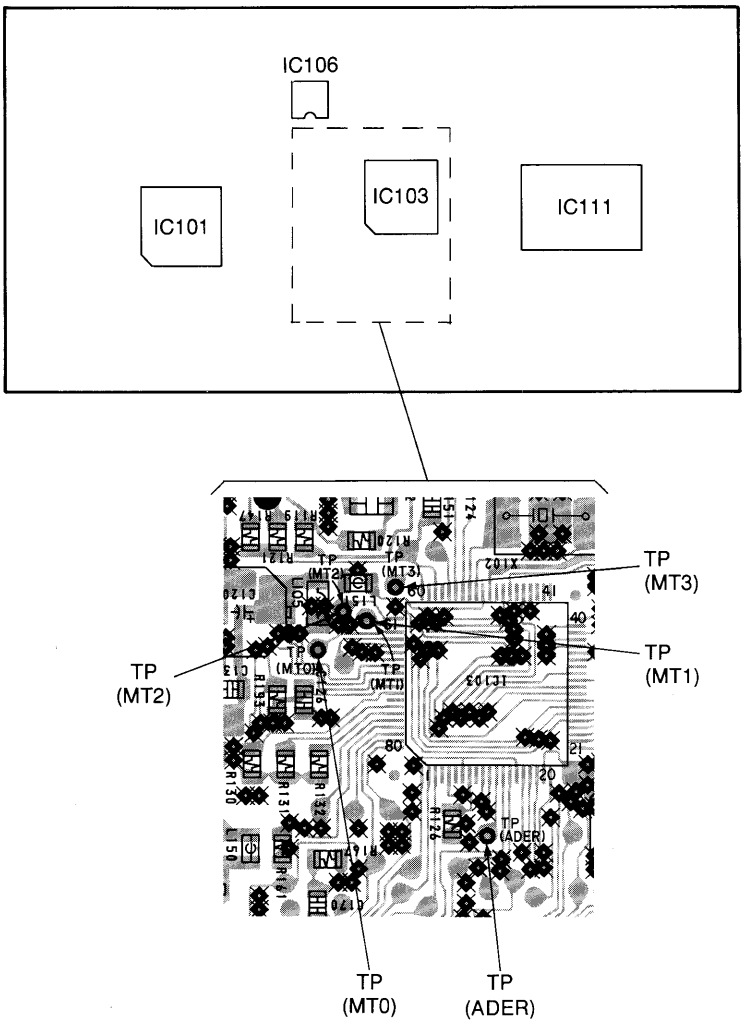
MO error rate confirmation: (MDS-B3 only)

1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIG board.
2. Insert the continued recorded disc. (Refer to "4-4. MO CONTINUED RECORDED DISC MAKING".)
3. Play mode switch of the OFF conditions.
4. Press the CUE/STDBY ⏭ key to let "RF mod=MO" appear. (RF mode : MO)
5. Press the ▶▶⏭ key to move the optical pickup from pit to outer circumference.
6. Press the PLAY/PAUSE ▶❚❚ key to let "C PLAY MID" appear. (middle circumference continued playback)
7. Confirm that the error rate (C1) of the error rate counter is less than 50.
8. Press the STOP ■ key to stop the playback.
9. Press the EJECT ⏏ key to take out the continued recorded disc.

4-13. ADJUSTMENT LOCATION



DIG board



SECTION 5
IC PIN FUNCTIONS

● IC103 EFM/ACIRC ENCODER/DECODER (CXD2525R) ∗(3) of I/O is state output and (A) is analog output.

Pin No.	Signal Name	I/O	Function
1	MDP	O(3)	Spindle motor servo control
2	MDS	O(3)	Spindle motor servo control
3	EFMI	I	Playback EFM input
4	ASY	O	Playback EFM full-swing output
5	LOCK	O	Spindle servo (CLV) lock state monitor Locks at "H"
6	VCOO	O	EFM decoder analog PLL oscillation output (196Fs=8.6436MHz)
7	VCOI	I	EFM decoder analog PLL oscillation input (196Fs=8.6436MHz)
8	TEST1	I	Test terminal Normally: GND
9	PDO	O(3)	EFM decoder analog PLL phase comparison output
10	VSS	—	Digital GND
11	EFMO	O	EFM output during recording
12	ATER	O	ADIP CRC flag output "H" when error
13	CNIN	I	Track jump number count signal input
14	SENS	O(3)	Internal status output terminal for the serial bus address
15	SYPL	I	SQSY, ADSY, DQSY, MQSY polarity switching input terminal Active high when "H"
16	FILO	O(A)	Digital PLL master PLL filter output
17	FILI	I	Digital PLL master PLL filter input
18	PCO	O(3)	Digital PLL master PLL phase comparison output
19	AVSS	—	Analog GND
20	CLTV	I	Digital PLL master PLL VCO control voltage input
21	AVDD	—	Analog power supply
22	XRST	I	System reset signal input Active "L"
23	REC	I	Decoder when "L" and encoder when "H"
24	TEST8	I	Test terminal Normally: GND
25	SCLK	I	Serial bus clock input
26	XLAT	I	Serial bus latch input
27	SWDT	I	Serial bus writing data input
28	SRDT	O(3)	Serial bus reading data output
29	ADSY	O	ADIP sync output
30	SQSY	O	Sub code Q sync output
31	VDD	—	Digital power supply
32	DQSY	O	Sync (SCOR) output of sub code Q of the digital in U-bit CD format
33	TEST7	O	Open
34	DTI	I	Recording audio signal input
35	DTO	O(3)	Playback audio signal output High impedance during recording
36	C2PO	O	Playback: C2PO, Digital REC: D or In-VFLAG, Analog REC: 0
37	BCK	O	2.8224MHz output (MCLK system)
38	XBCK	O	BCK reverse output (MCLK system)
39	LRCK	O	44.1kHz (=Fs) output (MCLK system)
40	WDCK	O	88.2kHz output (MCLK system)
41	FS4	O	176.4kHz output (MCLK system)
42	GTOP	O	Open the sync protection window when "H" (INPUT EFM SYNC monitor output)
43	XUGFS	O	Unguarded frame sync at "L" (INPUT EFM SYNC monitor output)
44	XPLCK	O	EFM decoder PLL clock output (98Fs=4.3218MHz)
45	GFS	O	Frame sync OK at "H" (INPUT EFM SYNC monitor output)

Pin No.	Signal Name	I/O	Function
46	EPDO	O(3)	EFM encoder external PLL phase comparison output Frequency: Low → "H"
47	RFCK	O	7.35kHz output (MCLK system)
48	EVCI	I	EFM encoder external PLL oscillation input (196Fs=8.6436MHz)
49	EVCO	O	EFM encoder external PLL oscillation output (196Fs=8.6436MHz)
50	VSS	—	Digital GND
51	MCLK	O	22.5792MHz output Duty will not be protected
52	XTAI	I	Crystal oscillation input (512Fs=22.5792MHz)
53	XTAO	O	Crystal oscillation output (512Fs=22.5792MHz)
54	TEST9	I	Fixed at "L"
55	MVCI	I	Digital-in PLL oscillation input (512Fs=22.5792MHz)
56	MVCO	O	Digital-in PLL oscillation output (512Fs=22.5792MHz)
57	TEST2	O	Fixed at "Open"
58	DIPD	O(3)	Digital-in PLL phase comparison output Frequency: Low → "L"
59	RAOF	O	RAM overflow output (Monitor output of decoder)
60-63	MT3-MT0	O	Playback corrected state monitor output
64	WFCK	O	7.35kHz output (EFM decoder PLL system during playback, EFM encoder PLL system during recording)
65	DIN	I	Digital audio input terminal
66	MD2	I	Digital audio out ON/OFF terminal ON when "H"
67	DOUT	O	Digital audio output terminal
68	DIDT	O	Audio data output terminal of the digital audio input terminal
69	DODT	I	16-bit data input terminal for the digital audio output
70	DOVF	I	Validity flag input terminal for the digital audio
71	VDD	—	Digital power supply
72	TEST3	I	Fixed at "L"
73	TEST4	O	Fixed at "Open"
74	TEST5	I	Fixed at "L"
75	TEST6	I	Fixed at "L"
76	FMCK	I	ADIP reading clock input (6.3kHz) (TTL Schmidt input)
77	FMDT	I	ADIP data input (TTL Schmidt input)
78	ADFG	I	ADIP carrier signal input (TTL Schmidt input)
79	FSW	O(3)	Spindle motor output filter switching output "Z" when CLV-P, Others: "L"
80	NON	O	Spindle motor ON/OFF control output ON when "H"

Note: • XUGFS is frame sync obtained from the EFM signal and a negative pulse. Signal before sync protection.
• PLL is made for XPLCK so that changes in the reversion and falling edge of the EFM PLL clock and the EFM signal match.
• The GFS signal becomes "H" when the frame sync and interpolation protection timing match.
• C2PO is a signal which shows the error state of the data.
• RAOF is a signal generated when the 32K RAM exceeds the ±4F jitter margin.

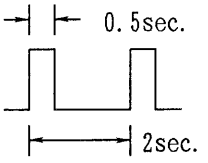
• IC110 SHOCKPROOF MEMORY CONTROLLER (CXD2526Q)

Pin No.	Signal Name	I/O	Function
1	A14	O	When RMSL is "H": SRAM address bus A14, When RMSL is "L": WFFUL (Note)
2	A15	O	When RMSL is "H": SRAM address bus A15, When RMSL is "L": RFEMP (Note)
3	A16	O	When RMSL is "H": SRAM address bus A16, When RMSL is "L": WFOVF (Note)
4	A17	O	When RMSL is "H": SRAM address bus A17, When RMSL is "L": WDTM (Note)
5	A18	O	When RMSL is "H": SRAM address bus A18, When RMSL is "L": ZERO (Note)
6	A19	O	When RMSL is "H": SRAM address bus A19, When RMSL is "L": MDTSC (Note)
7	A20	O	When RMSL is "H": SRAM address bus A20, When RMSL is "L": CMPSY (Note)
8	LRCK	I	LRCK input from the EFM encoder/decoder
9	BCK	I	BCK input from the EFM encoder/decoder
10	C2PO	I	C2PO input from the EFM decoder
11	DATA	I/O	Input/output data from the decoder during playback and that to the encoder during recording
12	VSS	—	Ground terminal
13	TEST	I	Test terminal Normally: fixed at "L"
14	XRST	I	Reset signal input Resets when "L"
15	DFCT	I	External input monitor signal input terminal Inputs the signal to be monitored
16	SRDT	(HiZ) O	Microprocessor serial data output terminal "Hi-z" when the CXD2526 read register is not selected
17	SWDT	I	Microprocessor serial data input terminal
18	XSLT	I	Microprocessor serial data latch input terminal
19	SCK	I	Microprocessor serial data shift clock input terminal
20	SCTX	I	Data output enable signal input terminal in the recording mode
21	PCPB	I	"L": Playback mode, "H": Recording mode
22	WRMN	I	"H": Write mode, "L": Monitor mode
23	SBMN	I	"H": Records the input signal according to the SDCT "L": Records according to the DCT
24	XINT	O	Interrupting request output terminal "L": When the interrupting status is generated
25	MDSY	O	Input data MD sync detection signal
26	MEMFUL	O	"H" when the main data area is full with data
27	MEMEMP	O	"H" when the main data area is empty
28	UNDER	O	"H" when RMS<THUND
29	OVER	O	"H" when RMS≧THOVR
30	ERWR	O	"H" when the data whitch C2PO is effective is written in the RAM
31	BTOV4	O	"H" when BCT≧400 (Hex)
32	TXST	O	"H" when data is transmitted
33	VDD	—	System power supply
34	BUSY	I/O	"H" when RAM is accessed
35-37	ZZ2-ZZ0	I	Test signal Fixed at "L"
38	XALT	O	Data ready or latch signal to CXD2531
39	ADT1	I	Terminal for data input from CXD2531
40	ADT0	O	Terminal for data output to CXD2531
41	ACK	O	Terminal for data input/output clock output to CXD2531
42	AC2	O	Terminal for output data C2PO output to CXD2531
43	XRQ	I	Terminal for data request signal input from CXD2531
44	SDCK	I	External sub data I/F shift clock input
45	SBDT	I/O	External sub data I/F data output terminal in the playback mode and the data input terminal in the recording mode

Pin No.	Signal Name	I/O	Function
46	XWT	O	External sub data I/F wait signal Must not transmit the clock for reading the new data at "L"
47	SRDY	O	External sub data I/F access permission signal Ignores the clock for sub data R/W if it is transmitted at "H"
48	MCK	O	128Fs output terminal
49	F256	O	256Fs output terminal
50	XTLO	O	System clock output terminal (22.5792MHz)
51	XTLI	I	System clock input terminal (22.5792MHz)
52	VSS	—	Ground terminal
53	CKSL	I	Fixed at "L"
54	RMSL	I	External RAM select terminal "H": SRAM, "L": DRAM
55	ERR	I/O	C2PO input/output terminal when EXTC2R is "H"
56	D7	O	SRAM data bus D7 when RMSL is "H" Test signal when RMSL is "L"
57	D4	I/O	SRAM data bus D4 when RMSL is "H" Test signal when RMSL is "L"
58	D0	I/O	RAM data bus D0
59	D1	I/O	RAM data bus D1
60	D3	I/O	RAM data bus D3
61	D2	I/O	RAM data bus D2
62	XCAS	I/O	DRAM $\overline{CAS}$ output when RMSL is "L" Data bus D6 when RMSL is "L"
63	XOE	O	RAM output enable
64	A10	O	RAM address bus A10
65	XWE	O	RAM write enable
66	XRAS	I/O	DRAM $\overline{RAS}$ output when RMSL is "L" Data bus D5 when RMSL is "H"
67	A11	O	RAM address bus A11
68	A9	O	RAM address bus A9
69	A0	O	RAM address bus A0
70	A1	O	RAM address bus A1
71	A2	O	RAM address bus A2
72	A3	O	RAM address bus A3
73	VDD	—	System power supply
74	A8	O	RAM address bus A8
75	A7	O	RAM address bus A7
76	A6	O	RAM address bus A6
77	A5	O	RAM address bus A5
78	A4	O	RAM address bus A4
79	A12	O	RAM address bus A12 when RMSL is "H" CS output when RMSL is "L"
80	A13	O	RAM address bus A13 when RMSL is "H" SYOK output when RMSL is "L"

Note: WFFUL: Becomes "H" when the writing FIFO becomes full.
RFEMP: Becomes "H" when the reading FIFO becomes empty.
WFOVF: Becomes "H" when the writing FIFO becomes overflow.
WDTM : Outputs the window timing inside the D1 clock.
ZERO : Outputs "H" when BCT is 0.
MDTSC: Becomes "H" when the input data header selector is 00 to IF and "L" at other times.
CMPSY: Interpolation sync timing.

● IC111 MECHANISM CONTROL MICROPROCESSOR (M38067E8-FP-B3-1)

Pin No.	Signal Name	I/O	Function
1-3	KEY2-KEY0	I	Not used this set (Fixed at "L")
4	—	I	Not used this set (Fixed at "H")
5	DFATT	O	Serial data output to the D/A converter (IC702)
6	DFSHIFT	O	Serial clock output to the D/A converter (IC702)
7	DFLATCH	O	Serial latch output to the D/A converter (IC702)
8	XLAT	O	Latch signal output to the serial bus
9	SCLK	O	Clock signal output to the serial bus
10	SWDT	O	Write data signal output to the serial bus
11	SRDT	I	Read data signal input from the serial bus
12	APCREF	O	Reference voltage D/A output of the laser power Four levels: OFF, CD, MO READ, MO WRITE
13-15	—	I	Not used this set (Fixed at "H")
16	ADSY	I	ADIP sync input "L" every 13.3ms, Almost "H"
17	SQSY	I	Sub-code Q sync input "L" every 13.3ms, Almost "H"
18	DQSY	I	U-bit CD format sub-code Q sync of digital in "L" every 13.3ms, Almost "H"
19	SENS	I	Status input from the serial bus
20	MINT	O	Request for temporary interruption of communication with the master control microprocessor (IC301) The master control microprocessor (IC301) does not send the clock during "H"
21	CLK	I	Communication clock input from the master control microprocessor (IC301)
22	TXD	O	Serial data output to the master control microprocessor (IC301)
23	RXD	I	Serial data input from the master control microprocessor (IC301)
24	XINT	I	Request for interruption from the shockproof memory controller (IC110)
25	JUMP PULSE	I	Signal from the track-jump detection circiut 1 pulse in output every 1 track
26	CNVSS	—	Mode setting terminal at power start-up (Fixed at "L")
27	RESET	I	Reset signal input "H" after several hundred ms of "L" after power start-up
28, 29	—	I	Not used this set (Fixed at "H")
30	XIN	I	Clock signal input (6MHz)
31	XOUT	O	Clock signal output (6MHz)
32	VSS	—	Ground terminal
33	A RESET	O	Reset signal output to the ATRAC encoder/decoder (IC101, 102)
34, 35	—	I	Not used this set (Fixed at "H")
36	ALLD	O	APCREF/CONSTANT selection output When CD playback power: "L", When MO playback power: "H"
37	RMS	O	Laser modulation selection output When playback power: "L", When stop: "H", When recoding power: 
38	LOAD IN	O	Control signal output to the loading motor (M401) *1
39	LOAD OUT	O	Control signal output to the loading motor (M401) *1
40	PIT/GROOVE	I	PIT/GROOVE detection input "H": Disc for playing and TOC area
41	C.OUT	I	Track number counting signal input

Pin No.	Signal Name	I/O	Function
42	DIRC	O	Output terminal for the IC205 (CXA1082BQ) during 1 track jump
43	AGCTC	O	AGC time constant selection output "L": Focus searching and power selection
44	DFCTSW	O	Defect ON/OFF selection output
45	FOK	I	Focus OK signal input "H" is input when the focus is applied
46	CD/MO	I	CD/MO discrimination signal input
47	RFSW1	O	Disc mode selection signal output "H": PIT, "L": GROOVE
48	RFSW0	O	Disc mode selection signal output "H": High reflection rate disc, "L": Low reflection rate disc
49	MAGUP	O	Not used this set (Open)
50	MGSERVO	O	Not used this set (Open)
51	—	I	Not used this set (Fixed at "H")
52	CARTRIG	I	Not used this set (Fixed at "H")
53	DSCPRO	I	REC proof detection input "H": Protect
54	RFLCT	I	Disc reflection rate detection input "H": Low reflection rate disc
55	LIMITIN	I	Limit in switch input "L": Sled limit in
56	INSW	I	Loading in switch input "L" at the position where the head descends, Others: "H"
57	OUTSW	I	Loading OUT switch input "L" at the position of load out, Others: "H"
58	SLEN	O	Sled servo ON/OFF control output Normally, the LOCK of pin 72 is output
59	FBC	O	Focus bias control output
60	MNSB	O	Main/sub-data counter selection output to the shockproof memory controller (IC110)
61	WRMN	O	Write/monitor mode selection output to the shockproof memory controller (IC110)
62	INSL	I	Not used this set (Fixed at "H")
63	EXEC	I	Not used this set (Fixed at "H")
64	MUTE	O	Digitl output V flag control output to the D/A converter (IC702) The inverted AMUT of pin 65 is output
65	AMUT	O	Line out muting output
66	DIG/ANA	O	ON/OFF selection of the digital in PLL circuit "H": ON, "L": OFF
67	—	I	Not used this set (Fixed at "H")
68	GFS	I	Guard frame sync input
69	SORS	O	Not used this set
70	REC	O	Encoder/decoder mode selection output to the shockproof memory controller (IC110) and EFM/ACIRC encoder/decoder (IC103) "H": Encoder mode
71	SCTX	O	Writing data transmission timing output Used together with the magnetic field head ON/OFF output
72	LOCK	I	Spindle lock detection input "H": Spindle lock mode
73	VCC	—	Power supply terminal (+5V)
74	VREF	I	D/A maximum output voltage input terminal of the pin 12 APCREF
75	AVSS	—	Analog ground terminal
76	CHACK. IN	I	Chucking in switch input When chucking: "L"
77	—	I	Not used this set (Open)
78	—	I	Not used this set (Fixed at "H")
79	ASY. DISEN	O	Asymmetry ON/OFF control output Other than disc data input: "H" Not used this set (Fixed at "H")
80	LDON	O	Laser ON/OFF control output When the laser is ON: "H"

*1 Loading motor control

	IN	OUT	BRAKE
LOAD IN 38 Pin	"H"	"L"	"H"
LOAD OUT 39 Pin	"L"	"H"	"H"

• IC301 MASTER CONTROL MICROPROCESSOR (M38004E8-SP-B3-2)

Pin No.	Signal Name	I/O	Function
1	VCC	—	Power supply terminal (+5V)
2, 3	LE1, LE2	O	Scan signal output to the LED301
4-10	G-A	O	Segment signal output to the LED301
11	$\overline{S}$/A SW	O	Selection signal output of the sircs remote contorller and audio bus Used sircs remote controller: "L"
12	232CS	O	Chip select output to the RS232C drive controller (IC351)
13	232ON	I	Fixed at "H"
14, 15	RMC	I	Remote control signal input
16	232WAIT	I	Request for temporary interruption of communication input from the RS232C drive controller (IC351)
17	232INT	O	Request for standby of communication output to the RS232C drive controller (IC351)
18	TWR	I	Not used this set (Open)
19	TCS	I	Not used this set (Open)
20	MCS	O	Data transfer ON/OFF selection output to the mechanism control micro-processor (IC111) "H": Data transfer ON
21	SCLK	O	Serial clock output
22	SDATA	O	Serial data output to the mechanism control microprocessor (IC111) and RS232C drive controller (IC351)
23	SIN	I	Serial data input from the mechanism control microprocessor (IC111) and RS232C drive controller (IC351)
24	SRST	I	Request for temporary interruption of communication input from the mechanism control microprocessor (IC111)
25	—	I	Not used this set (Fixed at "L")
26	CNVSS	—	Ground terminal
27	RST IN	I	Reset signal input
28	—	I	Not used this set (Fixed at "L")
29	FLCS	O	Chip select output to the display driver (IC302)
30	XIN	I	Clock signal input (5MHz)
31	XOUT	O	Clock signal output (5MHz)
32	VSS	—	Ground terminal
33	RSTO	O	System reset signal output
34	—	I	Not used this set (Fixed at "L")
35	SEOM	O	EOM status output
36	LED EJECT	O	EJECT LED drive signal output "H": LED ON
37	LED REC	O	REC LED drive signal output (MDS-B3 only) "H": LED ON
38	LED STOP	O	STOP LED drive signal output "H": LED ON
39	LED PAUSE	O	CUE STDBY LED drive signal output "H": LED ON
40	LED PLAY	O	PLAY LED drive signal output "H": LED ON
41	R&P/P	I	Select input for RECORDER/PLAYER model (MDS-B3) and PLAYER model (MDS-B4P) MDS-B3: Fixed at "H", MDS-B4P: Fixed at "L"
42-44	TEST1-TEST3	I	Test terminal (Fixed at "L")
45	—	I	Not used this set (Fixed at "L")
46	AUTO CUE	O	Muting output for auto cue "H": Auto cue
47, 48	KEYS1, KEYS0	O	Key scan signal output
49-54	KEY7-KEY2	I	Key scan signal input
55	ST PAUSE	O	PAUSE status output
56	ST PLAY	O	PLAY status output

Pin No.	Signal Name	I/O	Function
57	DO	O	Data signal output to the EEP ROM (IC304)
58	DI	I	Data signal input from the EEP ROM (IC304)
59	SCK	O	Clock signal output to the EEP ROM (IC304)
60	CE	O	Chip enable output to the EEP ROM (IC304)
61	BUSY	I	BUSY signal input from the EEP ROM (IC304)
62	REPEAT	I	Repeat mode selection input from the playback mode switch (S311) "H": REPEAT ALL mode
63	REPEAT 1	I	Repeat mode selection input from the playback mode switch (S311) "H": REPEAT 1 mode
64	—	I	Not used this set (Fixed at "L")

● IC351 RS232C DRIVE CONTROLLER (HD6473258P10-B3-4)

Pin No.	Signal Name	I/O	Function
1-4	P60-P63	—	Not used this set (Open)
5	232INT	I	Request for standby of communication input from the master control microprocessor (IC301)
6	232WAIT	0	Request for temporary interruption of communication output to the master control microprocessor (IC301)
7	232CS	I	Chip select input from the master control microprocessor (IC301)
8	RES	I	Reset signal input
9	XTAL	I	Clock signal input (19.8804MHz)
10	EXTAL	0	Clock signal output (19.8804MHz)
11	MD1	I	Mode select terminal (Fixed at "H")
12	MD0	I	Mode select terminal (Fixed at "L")
13	NMI	I	Not used this set (Fixed at "H")
14	VCC	—	Power supply terminal (+5V)
15	STBY	I	Standby input Not used this set (Fixed at "H")
16	VSS	—	Ground terminal
17-23	P40-P46	—	Not used this set (Open)
24	CTS	I	CTS (Clear To Send) input from the RS232C connector
25	TXD0	0	Serial data output to the master control microprocessor (IC301)
26	RXD0	I	Serial data input from the master control microprocessor (IC301)
27	SCK0	I	Serial clock input from the master control microprocessor (IC301)
28	TXD1	0	Transmit data signal output to the RS232C connector
29	RXD1	I	Receive data signal input from the RS232C connector
30	RTS	0	RTS (Request To Send) output to the RS232C connector
31	DSR	I	DSR (Data Set Ready) input from the RS232C connector
32	DTR	0	DTR (Data Terminal Ready) output to the RS232C connector
33	P72	0	Kill local signal output
34	P73	I	Kill local signal input from the D-SUB connector
35	AS	—	Not used this set (Open)
36	RD	0	Read signal output to the static RAM (IC352)
37	WR	0	Write signal output to the static RAM (IC352)
38	WAIT	I	Not used this set (Fixed at "H")
39	VCC	—	Power supply terminal (+5V)
40-42	A15-A13	0	Address signal for chip select output to the static RAM (IC352)
43-47	A12-A8	0	Address signal output to the static RAM (IC352)
48	VSS	—	Ground terminal
49-56	A7-A0	0	Address signal output to the static RAM (IC352)
57-64	D0-D7	I/O	Static RAM (IC352) data bus

SECTION 6
TECHNICAL INFORMATION

6-1. RS-232C PROTOCOL

The connection of this set with an external personal computer allows this set to be controlled from external equipment including the personal computer. This section describes its operating method from a viewpoint of electrical and software specifications.

6-2. SPECIFICATIONS

Format : Serial
Electrical characteristics: RS-232C compatible. (Not compatible with the "9pin remote (RS-422A)" such as SONY business-use VTR)
Connector : D-SUB 9pin, male, inch screw

Pin assignment and I/O signals:

Pin No.	I/O	Signal Name	Description
1	—	N.C.	Not used
2	I	RxDATA	Inputs reception data.
3	O	TxDATA	Outputs transmission data.
4	O	DTR	Notifies that the set is ready for communication
5	—	GND	Ground
6	I	DSR	Acknowledges that the PC is ready for communication.
7	O	RTS	Notifies that the set requests data transmission.
8	I	CTS	Acknowledges that the PC requests data transmission.
9	—	N.C.	Not used

6-3. OPERATING METHOD

- Synchronous mode between this set and personal computer
  Adjust the transmission rate, bit length, parity and stop bit length.
  The following provides a setting method.

Contents of Menu Set screen:

Items	Contents
Transmission rate	1200, 2400, 4800, 9600 (bauds)
Bit length	7, 8 bits
Parity	OFF, odd, even
Stop bit length	1, 2

1. Press simultaneously the STOP ■ key and DISPLAY key on the set.
   (Then, the Menu Set screen will appear.)
2. Press the DISPLAY key several times to open the Transmission Rate setting screen.
3. Press the NEXT ⏭ key or PREVIOUS ⏮ key to adjust the item set value.
   (At this time, the display is blinking.)
4. Press the PLAY/PAUSE ⏯ key for determination.
   (If determined, the display becomes continuous ON status.)
5. Each time the DISPLAY key is pressed, the next item setting screen (bit length, parity, stop bit length) is opened. Perform setting in the same manner.
6. Press the STOP ■ key, and you can escape from the Menu Set screen.

Note: These set values are saved even after the power switch is turned off.

● Connection with the RS-232C interface terminal on PC side

When connecting the RS-232C interface terminal of this set with that of PC, perform as follows.
Connect the DSR of this set with DTR of PC, and DTR of the set with DSR of PC.
These signals notify that both the set and PC are ready for communication.
Also, connect the CTS of the set with RTS of PC. The set does not transmit a data until the CTS is received (that is, the PC is ready). Likewise, connect the CTS of PC with RTS of the set so that the communication that meets the processing capacity of the set can be made.

Connection of connector

Set side

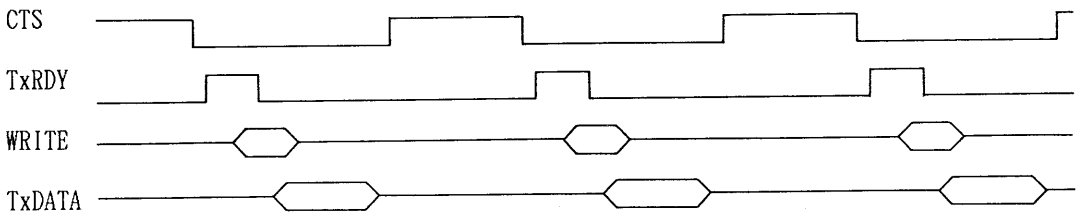
Pin No.	Signal Name
2	RxDATA
3	TxDATA
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

PC side

Signal Name	Description
TxDATA	Transmit Data
RxDATA	Receive Data
DSR	Data Set Ready
GND	Signal Ground
DTR	Data Terminal Ready
CTS	Clear To Send
RTS	Request To Send

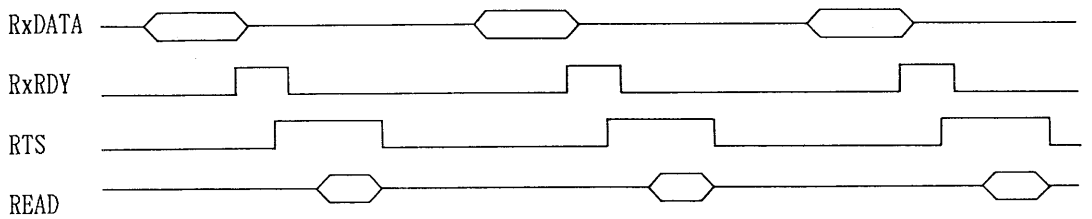
● Timing chart

In transmitting data



When the CTS becomes enabled, the TxRDY (TxREADY) signal of the set rises up and the set returns 1 byte of data.

In receiving data



Upon reception of data, the RxRDY (RxREADY) signal of the set rises up and the set disables the RTS to read that data, then it enables the RTS again.

● Transmission rate

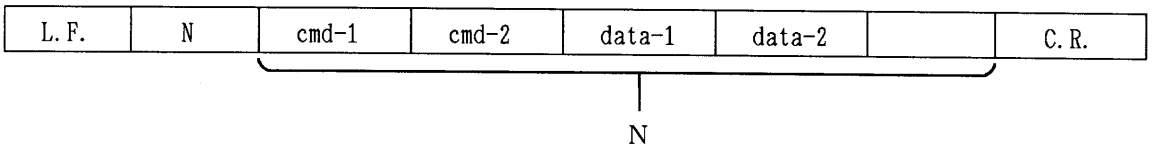
The set can use the transmission rate of maximum 9600 bauds. As for practical figures at the SMPTE 29.97Hz,

9600(bit/sec)/11(bit)/29.97(1/sec)=29.12(byte)
1(sec)/9600(bit/sec)*11(bit)=1.145(msec)

Namely, in one frame, the maximum number of bytes is 29 and its byte interval is 1.145msec. Upon reception of a command in one cycle, the set uses the RTS/CTS of hardware handshake to deassert that RTS (0) line so that it does not receive the next command block for subsequent 30msec. This means that if the command blocks are transmitted at random, the contents of transmission accumulate or they are destroyed. Also, since the data is received by the interrupt processing of CPU, the communication ignoring the handshake, transfer clock or transmission rate allows the set to receive data precedently, causing other processing not to be executed and resulting in stop of operation. (The set will be recovered if data reception is cancelled.) Thus, the above points should be taken into consideration when making a software using this interface.

● Command transmission format

The command transmission format of the set is as shown below.
All codes conform to the ASCII format. (A---F use upper cases.)
Add the line feed (L.F.) and carridge return (C.R.) at the top and end of command respectively.
Also, the number of data "N" is given in the ASCII code.

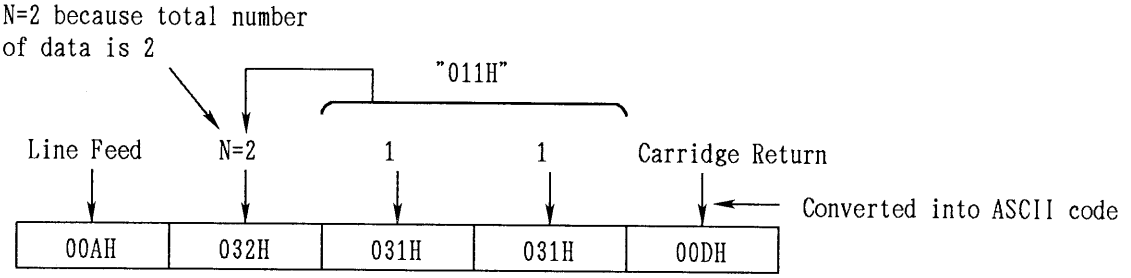


Note: The set does not support a command that gives notice of data receive error.

● Examples of command

Example 1: If PLAY command is sent

The playback is automatically starts when the PLAY command is sent in the STOP or PAUSE status.
The code of this command is "011H" as given by the Command List (see page 66, 67).
The "0" is added at the top of each command, which means that if a command containing alphabets such as "0FFH" is used, the "F" indicates hexadecimal "F" but it is not an alphabet "F" of ASCII codes.
Therefore, this "0" may be ignored in actual code conversion.
This "011H" is sent in the specified command transmission format, as shown below.



Example 2: If track (music) No. 123 is located

For this purpose, two commands "TRACK No. LOCATE POINT PRESET" and "TRACK No. LOCATE" must be sent (see page 71).

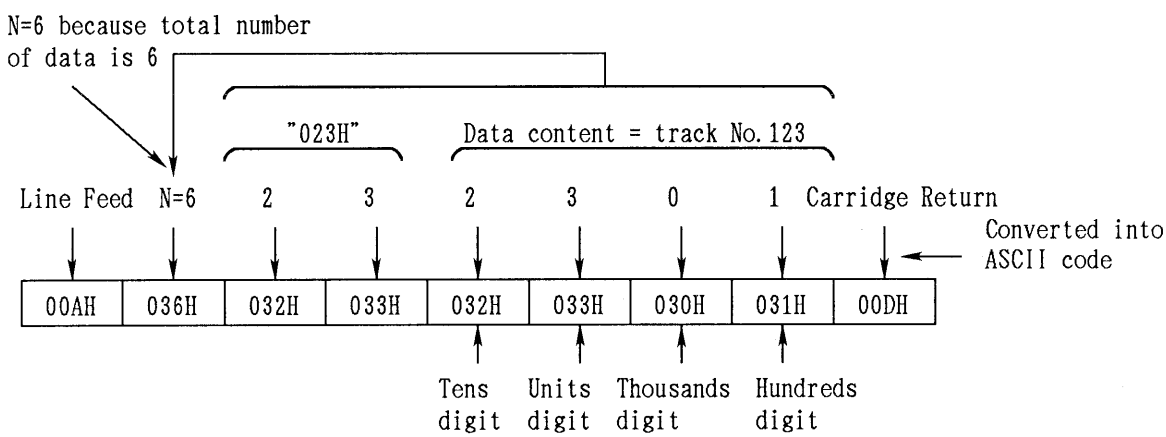
1. The code of "TRACK No. LOCATE POINT PRESET" is "023H" as given by the Command List (see page 66, 67).
2. This command is attached with the following data (see page 71).

DATA1(10, 1) {*000---255, decimal number}
DATA2(**, 100)

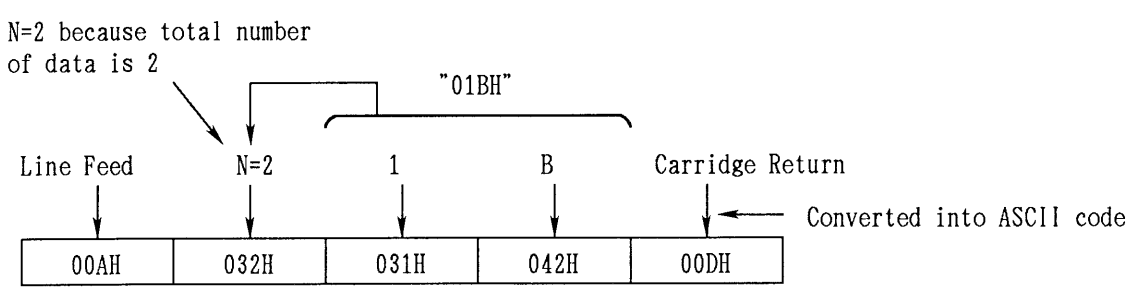
This selects the track (music) No. to be played (max. 255 tracks can be set for a mini disc).

"10" ····· Tens digit of track (music) No. designated
"1" ····· Units digit of track (music) No. designated
"**" ····· Thousands digit of track (music) No. designated
"100" ····· Hundreds digit of track (music) No. designated

Accordingly, the command to designate the track (music) No. 123 is "023H" + "Data content" as shown below.



3. The code of "TRACK No. LOCATE" is "01BH" as given by the Command List (see page 66, 67). This "01BH" is sent in the specified command transmission format, as shown below.



4. Under this condition, if the AUTO PAUSE function is turned off, the track (music) No. 123 is searched and played immediately. When the AUTO PAUSE function is turned on, the track (music) No. 123 is searched, then the set goes in the pause standby at the head of track No. 123.

● RS-232C controllable functions supported by the set

1. Controls supported

Items	Description	Reference Command
Basic Operation	RECORD STANDBY (Pause standby for recording)	013H
	RECORD (Executes recording)	013H
	TRACK RECORD (Assigns track No. at any point while executing recording)	013H
	STOP	010H
	PLAY (Playback)	011H
	PAUSE ON/OFF (Executes/cancels temporary stop)	010H
	CUE STANDBY (Returns to the play start point and sets pause standby status again)	010H
	CUE (Forwards/reverses at X8 speed)	016H
	NEXT/PREVIOUS (Forwards/rev. one track each)	01AH
	TRACK LOCATE (Plays arbitrary track No.)	01BH
	EJECT (Ejects a disc)	010H
	Setting the music order for program play (the order of musics to be played is changed temporarilly) and sensing the setting content	024H
	Setting the program play data and clearing (program area)	02CH
Mode Set	Selection of analog/digital input	038H
	ON/OFF of level sync. recording (Creates automatically the track No. according to the input level variation)	033H
	TIMER PLAY (Starts play automatically at the time of power on)	034H
	AUTO PAUSE (Plays one track, then sets a temporary stop)/AUTO CUE (Adjusts finely the sound generating timing at the head of track)	030H
	Setting of seconds for END OF MESSAGE function (Outputs status for track end/disc end notice)	032H
	ON/OFF of AUTO DISPLAY (Displays track title and time information alternately)	031H
	Misoperation prevention mode (Disables switches on the set, except some switches)	04CH
Status Sens	Sensing model name and software version	08FH
	Sensing power ON (POWER SW is turned on)	074H
	Sensing presence of disc, play-only disc, record & play disc, and status of disc protect notch	0D6H
	Sensing total tracks and total time of disc	0DDH
	Sensing mechanism status (RECORD, PLAY, STOP, PAUSE, CUE or EJECT status)	0D0H
	Sensing current track No.	0D5H
	Sensing status where the next track No. is searched during playing	076H
	Sensing end of message status	076H
	Sensing an error status	070H
	Sensing a caution status	071H
	Sensing an illegal status	072H
	Sensing run hours of spindle motor and laser pickup during recording	05EH

Items	Description	Reference Command
Time Information	Sensing the time from head of current track to current point under play or pause	0D8H
	Sensing the remaining time from current point under play or pause to end of track	0DCH
	Sensing the time available for recording (total empty areas of a disc)	0DBH
Character Information	Sensing disc title characters	0D7H
	Sensing current track title characters	0D9H
Editing Function	TRACK ERASE (Erases current track or specified track No.)	013H
	ALL ERASE (Erases all contents of a disc at a time)	013H
	DIVIDE (divides a music)	017H
	COMBINE (combines musics)	018H
	MOVE (changes music order to be played)	019H

2. Controls not supported
   - Disc insertion (External control is not supported because of manual operation)
   - Acquisition of cumulative passing time from head of disc to current point, and acquisition of cumulative remaining time from current point to end of disc.
   - Input of title characters
   - Acquisition of all titles of disc at a time (titles are called individually).

6-4. COMMAND DESCRIPTION

Indicates that the data is attached to the command.

● Command List

UPPER DIGIT / LOWER DIGIT	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		STOP, PAUSE, CUE STANDBY, EJECT		AUTO PAUSE, AUTO CUE SELECT		MECHA STATUS SENSE		ERROR SENSE REQUEST				AUTO PAUSE, AUTO CUE RETURN		MECHA STATUS RETURN		
1		PLAY		AUTO DISPLAY SELECT				CAUTION SENSE REQUEST				AUTO DISPLAY RETURN				
2				END OF MESSAGE TIME PRESET				ILLEGAL SENSE REQUEST				END OF MESSAGE TIME RETURN				
3		RECORD, ERASE	TRACK No. LOCATE POINT PRESET	LEVEL SYNC RECORD SELECT							TRACK No. LOCATE POINT RETURN	LEVEL SYNC RECORD RETURN				
4			PGM TRACK NO. PRESET	TIMER PLAY SELECT				POWER ON STATUS			PGM TRACK NO. RETURN	TIMER PLAY RETURN				
5						TRACK No. STATUS SENSE									TRACK No. STATUS RETURN		
6		CUE				DISC STATUS SENSE		MODE CHANGE STATUS						DISC STATUS RETURN		
7		DIVIDE				DISC NAME SENSE								DISC NAME RETURN		
8		COMBINE		AUDIO INPUT SELECT		CURRENT TRACK TIME SENSE		ERROR SENSE				AUDIO INPUT SELECT RETURN		CURRENT TRACK TIME RETURN		ERROR SENSE RETURN
9		MOVE				CURRENT TRACK NAME SENSE		CAUTION SENSE						CURRENT TRACK NAME RETURN		CAUTION SENSE RETURN
A		TRACK LOCATE						ERROR DATA CLEAR								
B		TRACK No. LOCATE				CURRENT TOTAL REMAIN TIME SENSE		CAUTION DATA CLEAR						CURRENT TOTAL REMAIN TIME RETURN		
C			PGM MODE SET		SWITCH ENABLE SELECT	CURRENT TRACK REMAIN TIME SENSE					PGM MODE RETURN		SWITCH ENABLE RETURN	CURRENT TRACK REMAIN TIME RETURN		
D						TOTAL TRACK No., TOTAL TIME SENSE								TOTAL TRACK No., TOTAL TIME RETURN		
E						HOUR METER SENSE								HOUR METER RETURN		
F	INFORMATION REQUEST								INFORMATION RETURN							

● Command Description

Name: INFORMATION REQUEST

Command : 00FH

Function: Requests the information such as model name and version of the set.

DATA : None

RETURN command: 08FH

Name: STOP, PAUSE, CUE STANDBY, EJECT

Command : 010H

Function: STOP, PAUSE, CUE STANDBY, EJECT commands.

- STOP function:
  Stops the motor (disc) and the mechanism is in a stationary status.
- PAUSE function:
  The set stores audio data in the buffer memory in the PAUSE mode, and therefore the audio data is immediately played without time lag of mechanism when the mode is changed from PAUSE to PLAY. Also, in the PAUSE mode at the head of track, a no-sound part at the head of track is skipped if the AUTO CUE function is turned on, thus enabling play in the more exact timing than the case where the AUTO CUE is turned off. Note, however, that the AUTO PAUSE is turned on whenever the AUTO CUE is turned on. (For details, see "AUTO PAUSE, AUTO CUE SELECT" command: 030H on page 72.)

  Note: In the PAUSE mode, the motor (disc) is continuously running. To stop the motor, the set must be placed in the STOP status, but if the disc is played from the STOP status, the time lag will be generated from reception of command to play of audio data because of mechanism operation.
- CUE STANDBY function:
  Upon reception of this command, the set locates the last play start point and sets PAUSE status there. This function is used to reproduce that point after the head of a music is heard for confirmation when a disc is played from an arbitrary point in the middle of a track.
- EJECT function:
  This command ejects a disc. It is active in the STOP mode only. The set supports manual disc insertion only and therefore it does not provide the disc insert command. Accordingly, the disc ejected once cannot be loaded again from the external remote controller.

DATA: 1

DATA1

000H: STOP
001H: CUE STANDBY
002H: PAUSE ON
003H: PAUSE OFF
004H: EJECT (disc ejection only, active is STOP mode only)

RETURN command: None

Name: PLAY

Command : 011H

Function: Starts playback.

Note:

- The playback will start if the PLAY command is sent without sending the PAUSE OFF, when playback starts from PAUSE ON status.

DATA: None

RETURN command: None

Name: RECORD, ERASE

Command : 013H

Function: Transmission of 002H "TRACK RECORD" during recording can assign a new track No. at an arbitrary timing.
Also, transmission of 003H "TRACK ERASE" or 004H "ALL ERASE" can erase an arbitrary track or all contents of disc at a time.
(Erasing is completed immediately.)

Notes:
- These commands are for the record and play set (MDS-B3) only.
- For recording and erasing, the disc must be a record and play type (impossible for a play only disc), and the disc protect notch must be set to the "writable" place. Also, for recording, there is an empty area in the disc.

DATA: 1 (3)
DATA1
000H: RECORD
001H: RECORD STANDBY (Recording and pause) (See Notes 1-6.)
002H: TRACK RECORD (Assigns a new track during recording)
003H: TRACK ERASE (Erases s specified track.) (See Note 7.)
004H: ALL ERASE (Erases all contents of a disc.)

RETURN command: None

Notes:
1. When executing the REC PLAY from the RECORD STANDBY status, send the PLAY command after confirming the REC STANDBY with the MECHA STATUS SENSE command.
2. It will take 2 or 3 seconds until the RECORD STANDBY status is established after the RECORD STANDBY command is received.
3. Reception of the RECORD command in the RECORD STANDBY status starts the recording immediately, while reception of RECORD command in the STOP status could lose recording for several seconds at the top.
4. The RECORD STANDBY status, if continuing for about 10 minutes, is automatically switched to the STOP status.
5. To stop recording temporarily, send the PAUSE ON (data 002H of command 010H). The RECORD STANDBY (data 001H of command 013H) is not accepted even if it is sent.
6. To restart recording from the RECORD STANDBY status, send the PLAY (command 011H) or PAUSE OFF (data 003H of command 010H). The RECORD (data 000H of command 013H) is not accepted even if it is sent.
7. Send the TRACK ERASE (data 003H of command 013H) in the STOP or PAUSE mode. In the PLAY mode, confusion will be present if a track changes during operation. Or, this command is not accepted in the RECORD mode.

- If the desired track No. is specified and erased in the STOP status:
  Send the following data after DATA1 (003H).
  DATA2 (10, 1) {*000---255, decimal number}
  DATA3 (**, 100)
- If the content is erased from the head of track to be erased in the PAUSE status:
  Send DATA1 (003H).

Name: CUE

Command : 016H

Function: Starts the cue operation (high speed playing). The audio data is played at about X8 speed (forward) or about X-8 speed (reverse).

Notes:
- For the cue operation, the set must be in the PLAY mode.
- The pitch (sound level) does not change, but chopped audio tones are generated and you will not be able to recognize the contents of audio tones in the cue operation.
- The speed is not changeable. (It is always about X±8 speed.)
- On the main unit, the cue operation is executed by pressing continuously the NEXT or PREVIOUS key in the PLAY mode. Also, for the PARALLEL REMOTE terminal, it is executed by making continuously the NEXT or PREVIOUS in the PLAY mode.

DATA:1
DATA1
002H: X8 speed
00AH: X-8 speed

RETURN command: None

Name: DIVIDE

Command : 017H

Function: Divides a music. This command is accepted in the PLAY or PAUSE mode.

DATA: 1
DATA1
000H: Divides a music at the PLAY or PAUSE position.
001H: Starts the rehearsal to divide a music at the PLAY or PAUSE position.
002H: Shifts the rehearsal point toward "+".
003H: Shifts the rehearsal point toward "−".
004H: Divides a music at the rehearsal point.
005H: Changes the rehearsal divide function. (60msec←→120msec)

Note:
- The execution of this command in the PLAY mode could change the track, resulting in confusion.

RETURN command: None

Name: COMBINE

Command : 018H

Function: Combines continuous plural musics into one music. This command is accepted in the STOP, PLAY or PAUSE mode.

DATA: 1 (3)
DATA1
000H:
If there are no DATA2 and DATA3:
A music at the PLAY or PAUSE position are combined with the previous music into one.
If there are DATA2 and DATA3:
The music designated with track No. in STOP status (DATA2, DATA3) is combined with the previous music into one.
001H:
The rehearsal for combining start. (Joint portion) IF there are DATA2 and DATA3, the rehearsal for a joint between the music specified with track No. (DATA2, DATA3) and the previous music is executed.
002H:
Plural musics are combined into one at the rehearsal point.

DATA2 (10, 1)
DATA3 (**, 100) } Designates in the STOP status the track No. to be combined.

Note:
- The execution of this command in the PLAY mode could change the track, and therefore operation should be performed in the PAUSE status.

RETURN command: None

Name: MOVE

Command : 019H

Function: Moves an arbitrary music to the desired position to change the order of play. Issue this command in the STOP or PAUSE (PLAY) mode.

DATA: 2 (4)
DATA1 (10, 1)
DATA2 (**, 100) } Destination (001---255, decimal number)
DATA3 (10, 1)
DATA4 (**, 100) } Music to be moved (001---255, decimal number)

Notes:
1. If the MOVE command is executed in the PAUSE (PLAY) mode, DATA: 2 is required. The execution of this command in the PLAY mode could change the track, resulting in confusion.
2. If the MOVE command is executed in the STOP mode, DATA: 4 is required.
3. This command is not accepted in the RECORD mode.

RETURN command: None

Name: TRACK LOCATE

Command : 01AH

Function: Forwards (or reverses) the tracks one by one. To start operation on the set, press the STOP or PREVIOUS key in the PAUSE mode. Pressing the NEXT or PREVIOUS key on the set in the PLAY mode starts the cue operation (high speed playing), but in the RS-232C control, transmission of this command even during playing establishes the TRACK LOCATE status and the tracks can be forwarded (or reversed) one by one.

DATA: 1
DATA1
000H: NEXT
001H: PREVIOUS

RETURN command: None

Name: TRACK No. LOCATE

Command : 01BH

Function: Searches an arbitrary track.
This command is used together with the "TRACK No. LOCATE POINT PRESET" (023H) command listed below to search the track No. preset by the 023H command.

Note:
- Although the set does not provide this function, the record and play set (MDS-B3) supports track No. searching by operating the 10 keys on the remote controller (RM-DC1).

DATA: None

RETURN command: None

Name: TRACK No. LOCATE POINT PRESET

Command : 023H

Function: Designates the track No. to be searched.
This command is used together with the "TRACK No. LOCATE" (01BH) command listed above.

DATA: 2 (1)
DATA1 (10,1) {*000---255, decimal number}
DATA2 (**,100)
DATA1=0FFH: TRACK No. LOCATE POINT SENSE
However, when DATA1=0FFH, TRACK No. LOCATE POINT SENSE becomes active to request the RETURN command 0A3H.

RETURN command: 0A3H

Name: PGM TRACK No. PRESET

Command : 024H

Function: Sets the track numbers (musics) for program play.
The musics can be set for each program area. (Program area 1-25)
In this case, set the music order and program area.

DATA: 4 (2)
DATA1 (10, 1)) Track No. (001-255)
DATA2 (**, 100)) (DATA1: 00FH)
(DATA2: ** for PGM SENSE)
DATA3: (10, 1) Music order (STEP) 01-25
DATA4: (10, 1) Program area 00-39

Note:
- If DATA3 and DATA4 are omitted (DATA: 2), the program area is 00, and the music order (STEP) is assigned sequentially to the area where no track No. has been set.

RETURN command: 0A4H

Name: PGM MODE SET

Command : 02CH

Function: Sets the data in an arbitrary program area for program play.

DATA: 2 (1)
DATA1
000H: PROGRAM SET
001H: PROGRAM SET PAUSE
002H: PROGRAM SET PLAY
(Only active at AP AC OFF)
0CCH: PROGRAM CLEAR
(Program area = 00, if there is no DATA2)
0EEH: PROGRAM MODE RESET
(There is no DATA2)
(This command is accepted in the STOP mode only)
0FFH: PROGRAM MODE SENSE
(There is no DATA2)
DATA2 (10, 1) Program area (00-39)
(In the case of PROGRAM CLEAR command, the program area = 0AA means that all program areas are cleared.)

Note:
- In the PROGRAM SET, PAUSE, PLAY or PROGRAM CLEAR mode, the program area = 00 if there is no DATA2.)

RETURN command: 0ACH

Name: AUTO PAUSE, AUTO CUE SELECT

Command : 030H

Function:

- AUTO PAUSE function:
  The PAUSE status is set at the head of next track automatically when play of a certain track is finished. This function is used when you do not desire continuous playing up to the next track or when you want to search the desired track but not to play it immediately. Also, this function is active in the repeat play or program play operation. (The PAUSE status is set at the head of a specified track in the one track repeat mode, or at the head of first track after execution of an entire disc in the all repeat mode.)
  Further, the use of TRACK No. LOCATE command causes the PAUSE status to be set when the specified track is searched. On the set, the AUTO PAUSE should be set on the MENU screen.
- AUTO CUE function:
  In searching a track, if there is a no-sound part (below -54dB) at the head of track, this function skips that part up to the sound rising part (-54dB) and sets the PAUSE status there. This function is used in the PAUSE status at the head of track to adjust finely the transmission of PLAY command with the sound rising timing.
  When this function is turned on, the AUTO PAUSE function is forcibly turned on, and therefore a combination of AUTO CUE=ON and AUTO PAUSE=OFF cannot be used.
  Further, searching of a no-sound part requires actual time, and if there is a no-sound part of, for instance, one minute, it takes one minute to read that part. On the set, the AUTO CUE should be set on the MENU screen.

DATA: 1
DATA1
000H: AUTO PAUSE OFF
001H: AUTO PAUSE ON
002H: AUTO CUE ON
(Also, AUTO PAUSE ON forcibly)
0FFH: AUTO PAUSE SENSE

RETURN command: 0B0H

Name: AUTO DISPLAY SELECT

Command : 031H

Function: Selects the display mode for the screen of the set.
Normally, the track title is displayed at the head of track, then it is switched to the time display automatically. If this function is turned on, the track title and time are displayed alternately.
To operate this function on the set press the DISPLAY key continuously for several seconds.

Note:

- This function is forcibly turned off at the time of power on.

DATA: 1
DATA1
000H: AUTO DISPLAY OFF
001H: AUTO DISPLAY ON
0FFH: AUTO DISPLAY SENSE

RETURN command: 0B1H

Name: END OF MESSAGE TIME PRESET

Command : 032H

Function: This function outputs the status from RS-232C or PARALLEL REMOTE terminal and causes the display of the set to be blinking, when the remaining time up to the end of track becomes several seconds (settable range: 1-35 sec. before end of track) during playing of a certain track.
The use of this function enables control of other external equipment, expecting the end of track.
The status is output at the head of track (in the PAUSE or PLAY mode), if the time of a track is shorter than set time. Also, the EOM status output at the end of disc can be selected.
In this case, other external equipment can be controlled, expecting the end of disc (settable range: 1-10 sec. before end of disc).

Notes:

- The track EOM and disc EOM cannot be set at a time.
- To turn off this function, set the EOM to 000H as shown below. As a result, no status is output from the RS-232C or PARALLEL REMOTE terminal.
- On the set, this function can be set on the MENU screen.

DATA: 1
DATA1
000H: EOM MODE OFF
If track EOM is set:
(10,1) {*000---035, decimal number}
If disc EOM is set:
(E,X) X=0: 1 sec before end of disc
X=1: 2 sec before end of disc
: :
: :
X=9: 10 sec before end of disc
0FFH: EOM SENSE

RETURN command: 0B2H

Name: LEVEL SYNC RECORD SELECT

Command : 033H

Function: This function writes automatically the track No. at the break of input signal during recording.
The track No. is created at the rising edge of audio signal, if the input level is below -54dB for more than 2 seconds.
For example, the track No. is written by utilizing a no-sound part between music. This function works to both analog and digital inputs.

DATA: 1
DATA1
000H: LEVEL SYNC OFF
001H: LEVEL SYNC ON
0FFH: LEVEL SYNC SENSE

RETURN command: 0B3H

Name: TIMER PLAY SELECT

Command : 034H

Function: Upon power on, this function automatically starts the play.
This function expects a simple control by an external timer device that turns on/off the AC power supply.
The following three modes can be selected.

1. TIMER PLAY OFF:
Upon power on, the set goes in STOP status.
2. TIMER PLAY ON:
Upon power on, the first track is located.
- When the AUTO PAUSE/AUTO CUE is ON:
The PAUSE status is set at the head of first track.
- When the AUTO PAUSE/AUTO CUE is OFF:
The first track is played automatically.

3. TIMER PLAY RESUME
The status at the time of power off is resumed when the power is turned on.
- When the power was turned off in the STOP status:
Upon power on, the STOP status is set.
- When power was turned off in the PAUSE status at the head of N track:
Upon power on, the PAUSE status is set at the head of N track if AUTO PAUSE/AUTO CUE is ON, or the N track is played automatically if AUTO PAUSE/AUTO CUE is OFF.
- When power was turned off during playing of head of N track:
Upon power on, the PAUSE status is set at the head of (N+1) track if AUTO PAUSE/AUTO CUE is ON, or the (N+1) track is played automatically if AUTO PAUSE/AUTO CUE is OFF.

Notes:

- The next track (Z+1) of last track Z of disc = first track when the REPEAT ALL function on the set is selected, or (Z+1) = STOP when the REPEAT OFF is selected.
- On the set, this function can be set on the MENU screen.

DATA: 1
DATA1
000H: TIMER PLAY OFF
001H: TIMER PLAY ON
002H: TIMER PLAY RESUME
0FFH: TIMER PLAY SENSE

RETURN command: 0B4H

Name: AUDIO INPUT SELECT

Command : 038H

Function: Selects the audio input.
The analog input and digital input can be selected.

Notes:
- This function is for the record and play set (MDS-B3) only.
- On the set, this function can be set on the MENU screen.

DATA: 1
DATA1
000H: ANALOG INPUT
001H: DIGITAL INPUT
0FFH: AUDIO INPUT SENSE
However, when DATA1=0FFH, the AUDIO INPUT SENSE command is selected to request the RETURN command 0B8H.

RETURN command: 0B8H

Name: SWITCH ENABLE SELECT (KILL LOCAL function)

Command : 04CH

Function: This function enables/disables operation keys on the front panel of set. Select the DISABLE (KILL LOCAL function) when you want to prevent misoperation. Also, the set provides the KILL LOCAL function in the parallel remote control mode, and the function is active if either RS-232C control or parallel control is turned on.

Notes:
- The STOP key and EJECT key cannot be disabled for urgent operation stop or disc ejection.
- The play mode switches (REPEAT 1/OFF/ALL) on the front panel and the switches on the rear panel cannot be disabled because of mechanical type.

DATA: 1
DATA1
000H: DISABLE
001H: ENABLE
0FFH: SWITCH ENABLE SENSE

RETURN command: 0CCH

Name: MECHA STATUS SENSE

Command : 050H

Function: Demands to output the status information of mechanism.
For the description of statuses, see 0D0H "MECHA STATUS RETURN" (see page 79).

DATA: None

RETURN command: 0D0H

Name: TRACK No. STATUS SENSE

Command : 055H

Function: Demands to output current track No.

DATA: None

RETURN command: 0D5H

Name: DISC STATUS SENSE

Command : 056H

Function: Demands to output information including presence of a disc, play-only disc, record and play disc, and disc protect notch status.

DATA: None

RETURN command: 0D6H

Name: DISC NAME SENSE

Command : 057H

Function: Demands to output the disc title (character information). (For the disc title, alphabets and symbols of up to 100 characters can be used.)

DATA: 1, or None (in this case, DATA1=000H)
DATA1
000H: 1-8 characters from beginning
001H: 9-16 characters from beginning
002H: 17-24 characters from beginning
⋮ ⋮
009H: 73-80 characters from beginning
00AH: 81-88 characters from beginning
00BH: 89-96 characters from beginning
00CH: 97-100 characters from beginning

RETURN command: 0D7H

Name: CURRENT TRACK TIME SENSE

Command : 058H

Function: Demands to output the passing time from head of track to current track in PLAY (or in PAUSE or CUE).
The "minute/second" and "minute/second/sub-second" can be selected.

Notes:
- The MD format of the set does not contain the time code. For this reason, the set does not support the slave operation by means of external cycle or phase modulation.
- The sub-second time is not output continuously, but it is output intermittently in the unit of 0.06 second because of the MD format condition of the set.

DATA: 1
DATA1
000H: Output of minute/second
001H: Output of minute/second/sub-second

RETURN command: 0D8H

Name: CURRENT TRACK NAME SENSE

Command : 059H

Function: Demands to output the title (character information) of current track in PLAY (or in PAUSE). (For the track title, alphabets and symbols of up to 100 characters per track can be used.)

DATA: 1, or None (in this case, DATA1=000H)
DATA1
000H: 1-8 characters from beginning
001H: 9-16 characters from beginning
002H: 17-24 characters from beginning
⋮ ⋮
009H: 73-80 characters from beginning
00AH: 81-88 characters from beginning
00BH: 89-96 characters from beginning
00CH: 97-100 characters from beginning

RETURN command: 0D9H

Name: CURRENT TOTAL REMAIN TIME SENSE

Command : 05BH

Function: Demands to output the remaining time (empty areas in a disc) available for recording in the RECORD or RECORD STANDBY mode.

Note:
- This function outputs the time in minute/second only, and the sub-second time is not output.

DATA: None

RETURN command: 0DBH

Name: CURRENT TRACK REMAIN TIME SENSE

Command : 05CH

Function: Demands to output the remaining time from current point in PLAY (or in PAUSE) to the end of track.

Note:
- This function outputs the time in minute/second only, and the sub-second time is not output.

DATA: None

RETURN command: 0DCH

Name: TOTAL TRACK No., TOTAL TIME SENSE

Command : 05DH

Function: Demands to output the total number of tracks and total time of a disc.

Note:
- This command is not accepted during recording.

DATA: None

RETURN command: 0DDH

Name: HOUR METER SENSE

Command : 05EH

Function: Demands to output cumulative run hour of spindle motor, and optical pick-up (during recording).

Notes:
- The run hour of optical pick-up is for the record and play set (MDS-B3) only.
- On the set, the time is displayed in the MENU mode.

DATA: 1
DATA1
000H: Run hour of spindle motor
002H: Run hour of optical pick-up (during recording)

RETURN command: 0DEH

Name: ERROR SENSE REQUEST

Command : 070H

Function: The set outputs this information to indicate that an error (failure or trouble) occurred in the set.
If this information is output, the controller should issue the 078H "ERROR SENSE" command to sense its content (see page 77).

DATA: None

RETURN command: 078H

Name: CAUTION SENSE REQUEST

Command : 071H

Function: The set outputs this information to indicate that the set is in caution status (it cannot operate any more due to external causes such as interrupted digital input during recording).
If this information is output, the controller should issue the 079H "CAUTION SENSE" command to sense its content (see page 77).

DATA: None

RETURN command: 079H

Name: ILLEGAL SENSE REQUEST

Command : 072H

Function: The set outputs this information to indicate that the set is in illegal status (an illegal command is received).

DATA: None

RETURN command: None

Name: POWER ON STATUS

Command : 074H

Function: The set notifies that its power was turned on.
If this information is output, the controller should issue various SENSE commands such as 00FH, 050H, 055H, 078H and 079H to sense the model, software version and other information that are not checked periodically.

DATA: Note

RETURN command: ***

Name: MODE CHANGE STATUS

Command : 076H

Function: The set notifies that the mode has changed as indicated with DATA1.

DATA: 1
DATA1
000H: MECHA STATUS CHANGE
- Upon this request from the set, the controller should issue the 050H "MECHA STATUS SENSE" (see page 74).

003H: TRACK/EOM STATUS CHANGE
- The set notifies that the track No. has changed and EOM was output (see 032H "END OF MESSAGE TIME PRESET" on page 72, 73).
Upon this request from the set, the controller should issue the 055H "TRACK No. STATUS SENSE" (see page 74).

Note:
- When the EOM function has been set, the status is output twice at the head of track and at EOM point in one track.

RETURN command: ***

Name: ERROR SENSE

Command : 078H

Function: Senses the kind of error for the 070H "ERROR SENSE REQUEST" (see page 76).

DATA: None

RETURN command: 0F8H

Name: CAUTION SENSE

Command : 079H

Function: Senses the kind of caution for the 071H "CAUTION SENSE REQUEST" (see page 76).

DATA: None

RETURN command: 0F9H

Name: ERROR DATA CLEAR

Command : 07AH

Function: Clears error data.

DATA: None

RETURN command: None

Name: CAUTION DATA CLEAR

Command : 07BH

Function: Clears caution data.

DATA: None

RETURN command: None

Name: INFORMATION RETURN

Command : 08FH

Function: Returns information for the 00FH "INFORMATION REQUEST" (see page 68).

DATA: 2
DATA1: MODEL
020H: Record and play set (MDS-B3)
021H: Play-only set (MDS-B4P)
DATA2: SOFTWARE VERSION (2-digit BCD)

REQUEST command: 00FH

Name: TRACK No. LOCATE POINT RETURN

Command : 0A3H

Function: Returns information for the 023H "TRACK No. LOCATE POINT PRESET" (see page 71). This information is returned even in the PLAY or PAUSE mode.

DATA: 2
DATA1 (10,1) {*001---255, decimal number}
DATA2 (**,100)

REQUEST command: 023H

Name: PGM TRACK No. RETURN

Command : 0A4H

Function: Returns information for the 024H "PGM TRACK No. PRESET" (see page 71).

DATA: 4
DATA1 (10, 1)
DATA2 (**, 100) } Track No. (001-255)
DATA3 (10, 1) Music order (STEP) (01-25)
DATA4 (10,1) Program area (00-39)

REQUEST command: 024H

Name: PGM MODE RETURN

Command : 0ACH

Function: Returns information for the 02CH "PGM MODE SET" (see page 71).

DATA: 2
000H: PGM MODE OFF
001H: PGM MODE ON

REQUEST command: 02CH

Name: AUTO PAUSE, AUTO CUE RETURN

Command : 0B0H

Function: Returns information for the ON/OFF of AUTO PAUSE or AUTO CUE function. (See 030H "AUTO PAUSE, AUTO CUE SELECT" on page 72.)

DATA: 1
DATA1
000H: AUTO PAUSE OFF
001H: AUTO PAUSE ON
002H: AUTO CUE ON (Also, AUTO PAUSE ON)

REQUEST command: 030H

Name: AUTO DISPLAY RETURN

Command : 0B1H

Function: Returns information for the ON/OFF of AUTO DISPLAY function. (See 031H "AUTO DISPLAY SELECT" on page 72.)

DATA: 1
DATA1
000H: AUTO DISPLAY OFF
001H: AUTO DISPLAY ON

REQUEST command: 031H

Name: END OF MESSAGE TIME RETURN

Command : 0B2H

Function: Returns information for the setting of END OF MESSAGE function. (See 032H "END OF MESSAGE TIME PRESET" on page 72, 73.)

DATA: 1
DATA1
000H: EOM MODE OFF
001H: EOM RETURN
1. When it is set at the end of track: (10,1) {*001---035, decimal number}
2. When it is set at the end of disc: (E,X) X=0: before 1 sec
X=1: before 2 sec
⋮ ⋮
X=9: before 10 sec

REQUEST command: 032H

Name: LEVEL SYNC RECORD RETURN

Command : 0B3H

Function: Returns information for the setting of LEVEL SYNC RECORD function. (See 033H "LEVEL SYNC RECORD SELECT" on page 73.)

DATA: 1
DATA1
000H: LEVEL SYNC RECORD OFF
001H: LEVEL SYNC RECORD ON

REQUEST command: 033H

Name: TIMER PLAY RETURN

Command : 0B4H

Function: Returns information for the setting of TIMER PLAY function. (See 034H "TIMER PLAY SELECT" on page 73.)

DATA: 1
DATA1
000H: TIMER PLAY OFF
001H: TIMER PLAY ON
002H: TIMER PLAY RESUME

REQUEST command: 034H

Name: AUDIO INPUT SELECT RETURN

Command : 0B8H

Function: Returns information for selection of audio input. (See 038H "AUDIO INPUT SELECT" on page 74.)

DATA: 1
DATA1
000H: ANALOG INPUT
001H: DIGITAL INPUT

REQUEST command: 038H

Name: SWITCH ENABLE RETURN (KILL LOCAL function)

Command : 0CCH

Function: Returns information for the 04CH "SWITCH ENABLE SELECT (KILL LOCAL function)" (see page 74).

DATA: 1
DATA1
000H: DISABLE
001H: ENABLE

REQUEST command: 04CH

Name: MECHA STATUS RETURN

Command : 0D0H

Function: Returns information for the 050H "MECHA STATUS SENSE" (see page 74).

DATA: 1
DATA1
MECHA STATUS
bit7: REC bit (in RECORD mode)
bit6: TOC WRITING (writing TOC on disc)
(For several seconds after EDIT command is received)
bit5: CUE bit (CUE of X8 speed)
bit4: STOP bit (in STOP mode)
bit3: REVERSE bit (CUE of X-8 speed)
001H: PLAY
010H: PAUSE ON
012H: STOP
013H: EJECT
014H: DISC OUT (disc was ejected)
023H: CUE (X8 speed)
02BH: CUE (X-8 speed)
052H: TOC WRITING
080H: REC STANDBY, REC PAUSE
081H: RECORD

Note:
- Each "bitX" listed above expresses the DATA definition listed under "bitX" in binary notation. Therefore, the commands actually returned are the DATA only such as "001H" and "023H".

REQUEST command: 050H

Name: TRACK No. STATUS RETURN

Command : 0D5H

Function: Returns information for the 055H "TRACK No. STATUS SENSE" (see page 74).

DATA: 3
DATA1 bit0: EOM STATUS
DATA2 (10,1) {*000---255, decimal number}
DATA3 (**,100)

REQUEST command: 055H

Name: DISC STATUS RETURN

Command : 0D6H

Function: Returns information for the 056H "DISC STATUS SENSE" (see page 74).

DATA: 1
DATA1
bit4: REC PROTECT (write protect status)
bit3: PRE RECORDED DISC
(a play-only disc is loaded)
bit0: DISC PRESENT (a disc is loaded)

REQUEST command: 056H

Name: DISC NAME RETURN

Command : 0D7H

Function: Returns information for the 057H "DISC NAME SENSE" (see page 74).

DATA: 9
DATA1
000H: 1-8 characters from beginning
002H: 9-16 characters from beginning
⋮ ⋮
00BH: 89-96 characters from beginning
00CH: 97-100 characters from beginning
DATA2
First character set by DATA1
DATA3
Second character set by DATA1
DATA4
Third character set by DATA1
DATA5
Fourth character set by DATA1
DATA6
Fifth character set by DATA1
DATA7
Sixth character set by DATA1
DATA8
Seventh character set by DATA1
DATA9
Eighth character set by DATA1

REQUEST command: 057H

Name: CURRENT TRACK TIME RETURN

Command : 0D8H

Function: Returns information for the 058H "CURRENT TRACK TIME SENSE". The time passing from the head of track in PLAY (or in PAUSE mode) (see page 75).

DATA: 3 (4)
DATA1
000H: Output of minute/second
001H: Output of minute/second/sub-second
DATA2
(Minute) 0-74
DATA3
(Second) 0-59
DATA4
(Sub-second) 0-99
However, the time is output intermittently in unit of about 0.06 second.

REQUEST command: 058H

Name: CURRENT TRACK NAME RETURN

Command : 0D9H

Function: Returns information for the 059H "CURRENT TRACK NAME SENSE" (see page 75).

DATA: 9
DATA1
000H: 1-8 characters from beginning
002H: 9-16 characters from beginning
: :
: :
00BH: 89-96 characters from beginning
00CH: 97-100 characters from beginning
DATA2
First character set by DATA1
DATA3
Second character set by DATA1
DATA4
Third character set by DATA1
DATA5
Fourth character set by DATA1
DATA6
Fifth character set by DATA1
DATA7
Sixth character set by DATA1
DATA8
Seventh character set by DATA1
DATA9
Eighth character set by DATA1

REQUEST command: 059H

Name: CURRENT TOTAL REMAIN TIME RETURN

Command : 0DBH

Function: Returns information for the 05BH "CURRENT TOTAL REMAIN TIME SENSE" (see page 75).

DATA: 2
DATA1 (Minute)
DATA2 (Second)

REQUEST command: 05BH

Name: CURRENT TRACK REMAIN TIME RETURN

Command : 0DCH

Function: Returns information for the 05CH "CURRENT TRACK REMAIN TIME SENSE" (see page 75).

DATA: 2
DATA1 (Minute)
DATA2 (Second)

REQUEST command: 05CH

Name: TOTAL TRACK No., TOTAL TIME RETURN

Command : 0DDH

Function: Returns information for the 05DH "TOTAL TRACK No., TOTAL TIME SENSE" (see page 75).

DATA: 4
DATA1 (10, 1)) TOTAL TRACK No.
DATA2 (**, 100))
DATA3 (Minute)) TOTAL TIME
DATA4 (Second))

REQUEST command: 05DH

Name: HOUR METER RETURN

Command : 0DEH

Function: Returns information for the 05EH "HOUR METER SENSE" (see page 76).

DATA: 4
DATA1
000H: Run hours of spindle motor
002H: Run hours of optical pick-up (in RECORD mode)
DATA2 (10, 1)
DATA3 (1000, 100)
DATA4 (**, 10000)

REQUEST command: 05EH

Name: ERROR SENSE RETURN

Command : 0F8H

Function: Returns information for the 078H "ERROR SENSE" (see page 77).

DATA: 2
DATA1 (**, ***)
DATA2 (, *)

Note:
- Read the above case as *-** ***.
  Example: 1-05, 2-50, etc.
  In case of no error:
  DATA1 (0, 0)
  DATA2 (, 0)

REQUEST command: 078H

ERROR code:

1-04	An error occurred in RAM (Random Access Memory: write/read memory).

Name: CAUTION SENSE RETURN

Command : 0F9H

Function: Returns information for the 079H "CAUTION SENSE" (see page 77).

DATA: 2
DATA1 (**, ***)
DATA2 (, *)

Note:
- Read the above case as *-** ***.
  Example: 1-05, 2-50, etc.
  In case of no caution:
  DATA1 (0, 0)
  DATA2 (, 0)

REQUEST command: 079H

ERROR code:

1-05	Backup Data Clear	
1-11	Digital IN Unlock	
1-12	Disc Full (Divide)	There are already 255 music.
1-13	Protected	Disc is write-protected.
1-14	Disc Full (REC)	No area remains for recording.
1-15	Retry Error	Normal recording impossible because of many vibrations and flaws in disc.
1-16	Retry	Recording is retried because of vibration and flaw in disc.
1-17	Disc Error	Many flaws or no TOC in disc.
1-18	Cannot Edit	Editing is impossible.
1-19	impossible or Sorry	Editing is impossible.
1-20	Track No. Over (Search)	An attempt to search music more than recorded ones was made.

6-5. TERMINAL FOR REMOTE CONTROLLER RM-DB3 (PARALLEL REMOTE)

The D-SUB 25pin terminal of the set provides connection with the RM-DB3 remote controller (parallel remote). Its electrical specification and function are as listed below.

1. Specification

Terminal type ..... D-SUB 25pin, female, metric screw
Format ..... Parallel
Command input ..... L: Ground short (100Ω max.)
H: Open collector (high impedance)
Note: The making time should be about 100ms to ensure performance.
Status output ..... L: 0.8V max. (Imax. 50mA)
H: Open collector (Vmax. 12V)
+5V output for LED ... Imax. 100mA

2. Pin Assignment and Function

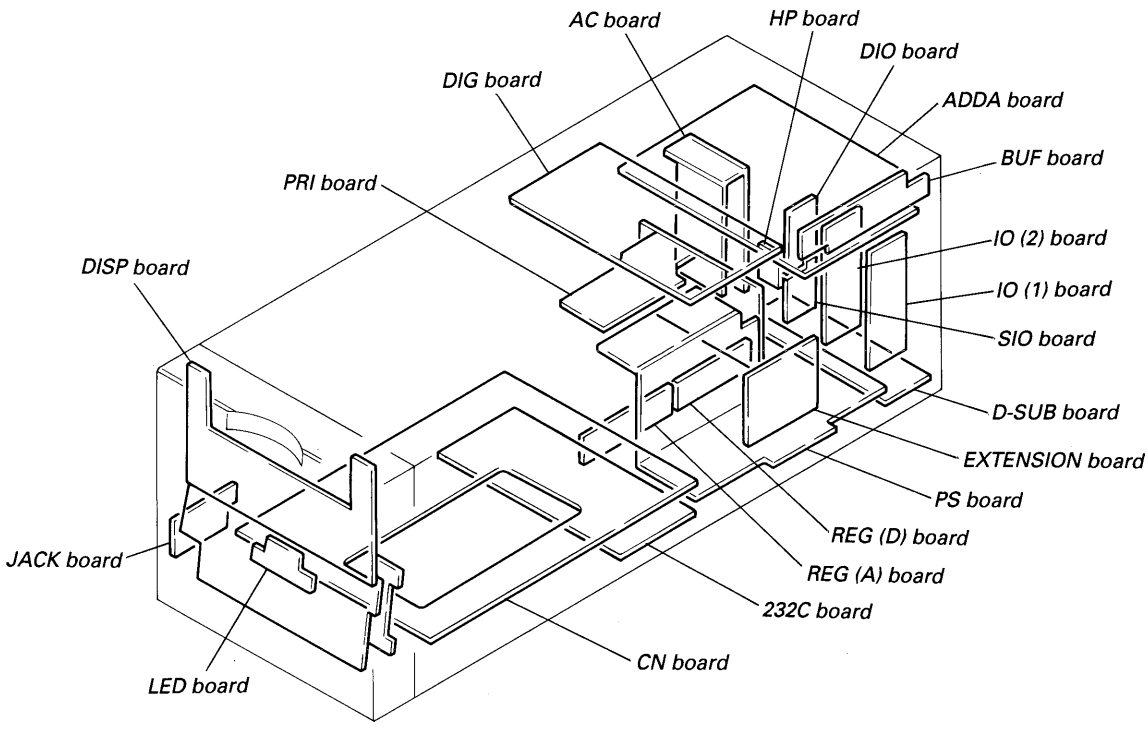
Pin No.	Signal and Description	Function
1	GND (for status output)	This pin is connected to the device GND via 47Ω.
2	PLAY Status output	This pin goes into make status in PLAY or CUE (fast play at X±8 speed).
3	END OF MESSAGE Status output	The notice status for the end of track (music) or disc. This pin goes into make status at the preset time (X seconds before end) and it opens at the end of track or disc. The time setting is made on the MENU screen of set or via RS-232C; settable range is 0-35 sec for track end or 0-10 sec for disc end in the unit of 1 sec.
4	STOP Status output	This pin goes into make status in STOP mode.
5	EJECT LED output	This signal is output during ejection of disc (LED is blinking).
*6	NEXT Command input	STOP mode: At an every short make status, tracks are forwarded one by one from first track, and at a long duration of make status over about 500ms, tracks are forwarded continuously from first track. If AUTO PAUSE is OFF, after this pin opens, that music is played by the input of PLAY command. If AUTO PAUSE is ON, after this pin opens, the PAUSE status is set at the head of that track. PAUSE mode: At a short make status, one track each is forwarded and the PAUSE status is set at the head of that track. At a long duration of make status over about 500ms, tracks are forwarded continuously, and after the pin opens, the PAUSE status is set at the head of that track. PLAY mode: CUE (fast play at X8 speed) operation is executed. • The status output in CUE mode is the PLAY. • To go to another mode after CUE, keep the PLAY status (NEXT pin is open) for more than 500ms, then input the next command.
7	GND (for command input)	This pin is connected to the device GND.
8	—	—
*9	EDIT Command input	Activates the EDIT mode to select the EDIT function.
*10	ENTER Command input	Executes editing.

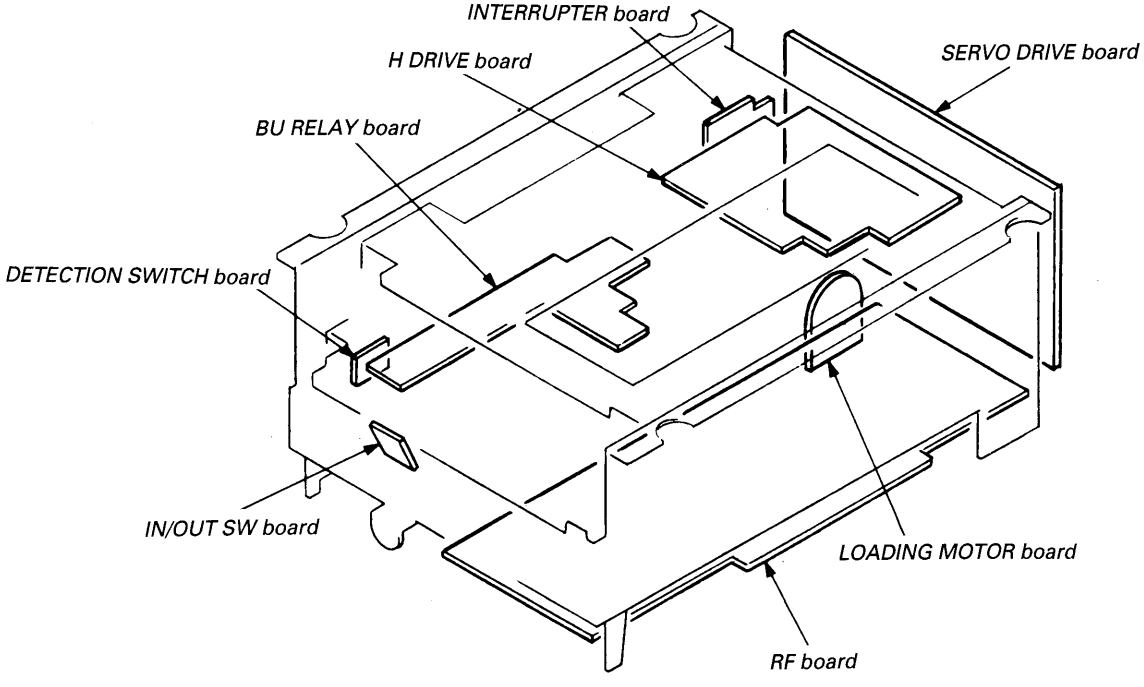
Pin No.	Signal and Description	Function
11	KILL LOCAL Command input	Disables the keys on front panel except EJECT, STOP and REPEAT keys to prevent misoperation.
12	—	—
13	—	—
14	CUE STANDBY LED output	Refer to the pin 24 "CUE STANDBY".
15	PAUSE Status output	This pin goes into make status in the PAUSE mode.
16	RECORD Status output	This pin goes into make status in the RECORD mode and RECORD PAUSE mode.
17	PLAY/PAUSE LED output	The LED lights continuously in PLAY mode, or it is blinking in PAUSE mode.
18	+5V	The +5V power is always output for external circuits.
19	—	—
*20	PLAY/PAUSE Command input	STOP mode: The first track is played if AUTO PAUSE is OFF, or the PAUSE status is set at the head of first track if AUTO PAUSE is ON. REC PAUSE mode: Starts recording. PAUSE mode: Play starts from that point. PLAY mode: The PAUSE status is set at that point.
*21	STOP Command input	The STOP mode is set.
*22	DISPLAY Command input	Selects character title display or time display.
*23	RECORD Command input	STOP mode: The RECORD PAUSE status is set. RECORD mode: At a make status, new track No. is written while keeping the recording.
*24	CUE STANDBY Command input	The PAUSE status is set at the last play start point.
*25	PREVIOUS Command input	STOP mode: At an every short make status, tracks are reversed one by one from first track, and at a long duration of make status over about 500ms, tracks are reversed continuously from last track. If AUTO PAUSE is OFF, after this pin opens, that music is played by the input of PLAY command. If AUTO PAUSE is ON, after this pin opens, the PAUSE status is set at the head of that track. PAUSE mode: At a short make status, one track each is reversed and the PAUSE status is set at the head of that track. At a long duration of make status over about 500ms, tracks are reversed continuously, and after the pin opens, the PAUSE status is set at the head of that track. PLAY mode: CUE (fast play at X-8 speed) operation is executed. ● The status output in CUE mode is the PLAY. ● To go to another mode after CUE, keep the PLAY status (PREVIOUS pin is open) for more than 500ms, then input the next command.

Note: Do not place plural command inputs (asterisked pin No.) into make status simultaneously, otherwise malfunction will occur.

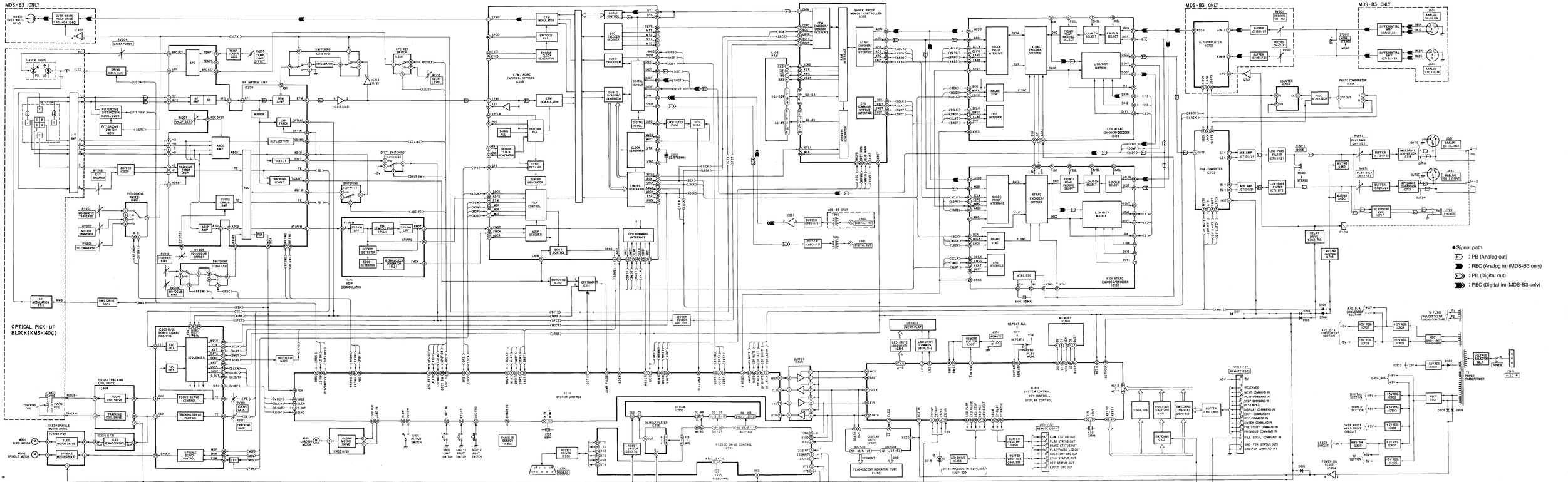
SECTION 7
DIAGRAMS

7-1. CIRCUIT BOARDS LOCATION



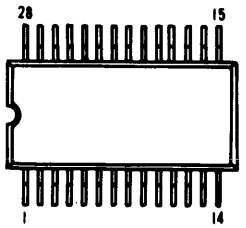


7-2. BLOCK DIAGRAM



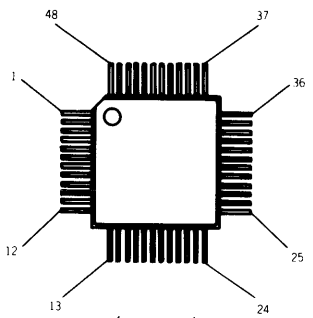
7-3. SEMICONDUCTOR LEAD LAYOUTS

CS5339-KS
CXD2564AM
LC3564QMF-10-TLM



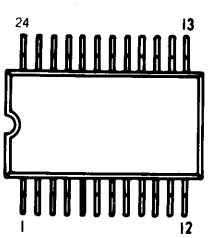
(TOP VIEW)

CXA1082BQ
CXA1381R



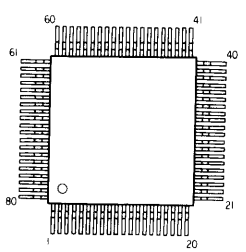
(TOP VIEW)

CXA1380N

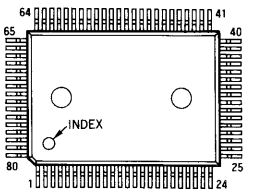


(TOP VIEW)

CXD2525R

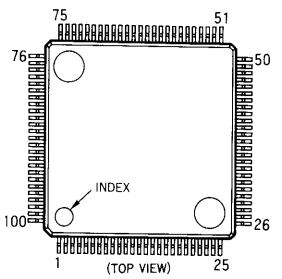


CXD2526Q
M38067E8-FP-B3-1



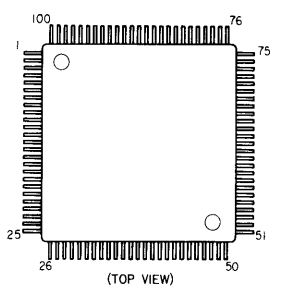
(TOP VIEW)

CXD2527R



(TOP VIEW)

CXD2527R-1

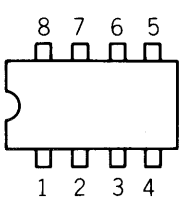


(TOP VIEW)

CXD8459M-T2

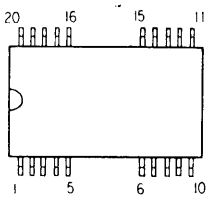
(TOP VIEW)

CXK1013P
M5218AP
NE5532P
μPC814C

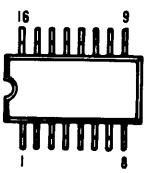


(Top view)

CXK41400TM-12

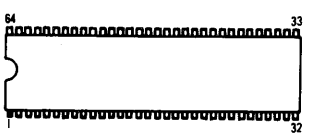


HD14053BFP
MC14052BF
SN74HC4020ANS
SN74HCT138ANS



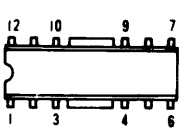
(TOP VIEW)

HD6473258P10-B3-4
M38004E8-SP-B3-2

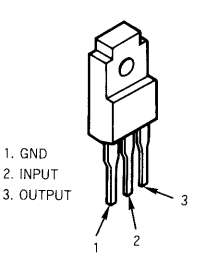


(Top view)

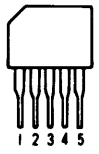
LA6523



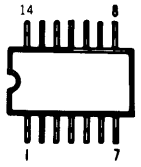
M5F79M12L
μPC79M05HF



M5293L

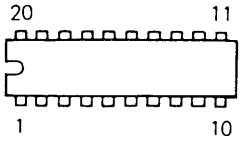


MC14011BF
MSM27C131ZB-04GS-KR1
SN74HC08ANS
SN74HCU04ANS
TC74HCU04AF



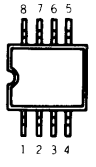
(TOP VIEW)

MC145407P



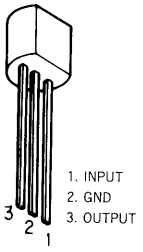
(Top view)

NJM4560M
TC4W53F
TC7W74FU
TC7WU04F
TL082M
TLC272CPS



(TOP VIEW)

NJM78L05A



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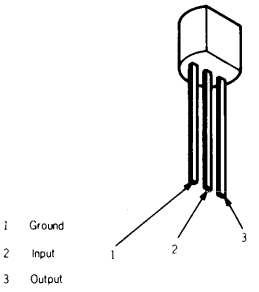
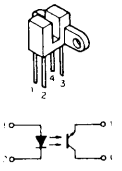
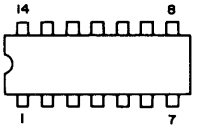


ON1023-S

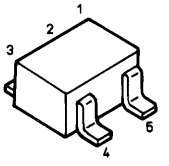


SN75ALS181N

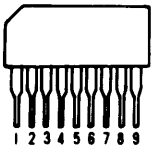


(TOP VIEW)

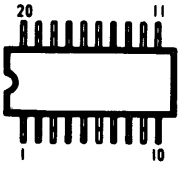
TC4S30F
TC7SU04F



TC5081AP

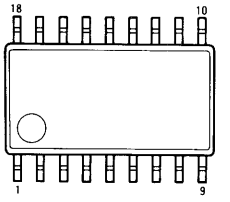


TC74ACT540F



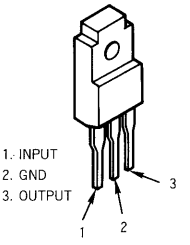
(TOP VIEW)

TD62381F



(TOP VIEW)

μPC2405HF
μPC2412HF



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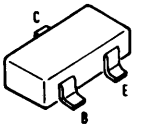
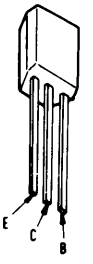
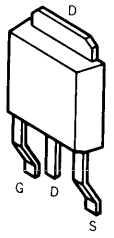
UN2111
UN2213
2SA1235-F
2SA1655
2SA1510
2SC1623-L5L6
2SC3395



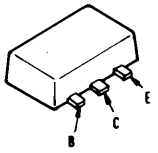
DTC114ES
2SA1503
2SC3623A-LK



ME6N10-TE16F3
ME8P06-TE16F3



2SB798-DL



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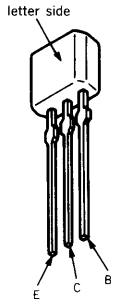

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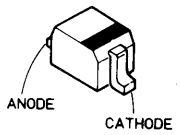
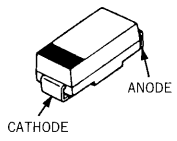
1SS352



F1P2STP



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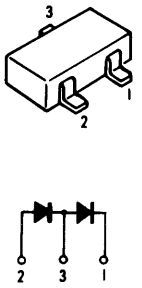
1SS226



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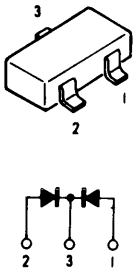
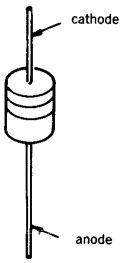
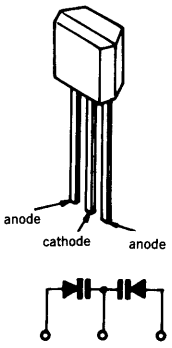
RB705D



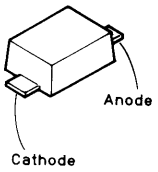
HZS6A1L



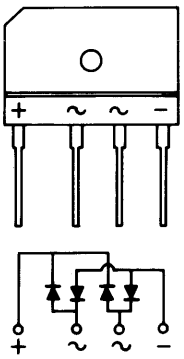
KV1550NT



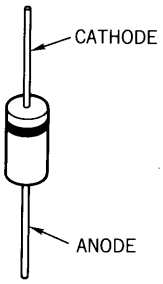
MA8030



RBA-406B



1N4148M
10E2



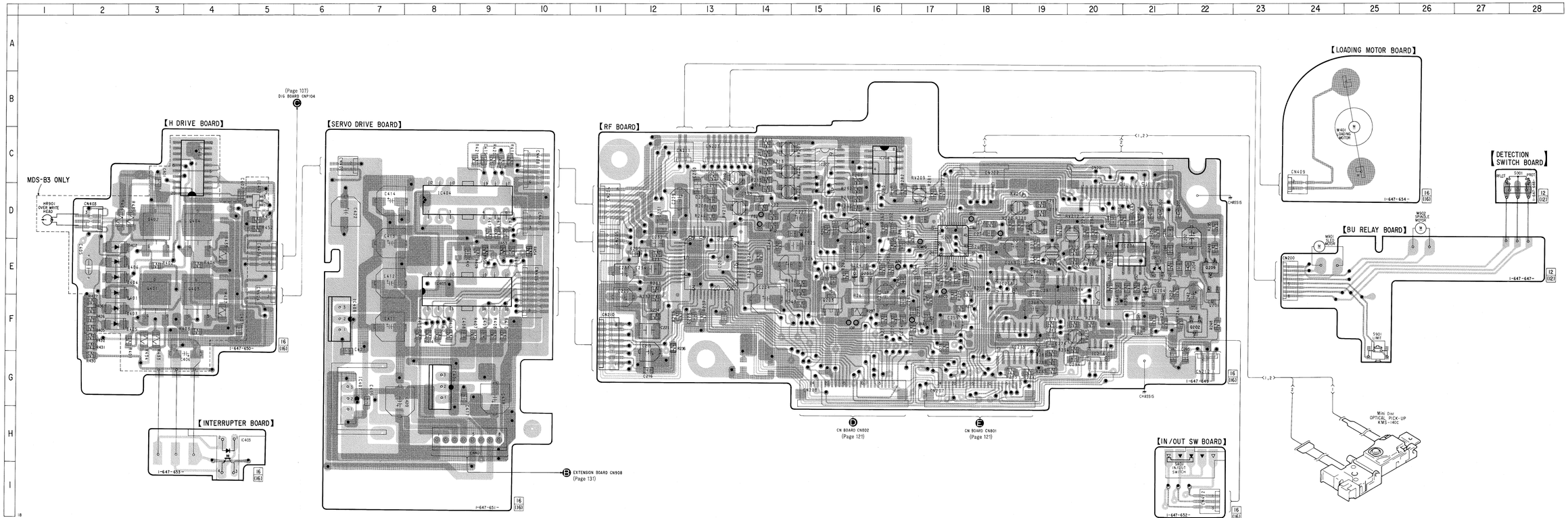
7-4. PRINTED WIRING BOARDS — RF Section —

● See page 84 for Circuit Boards Location, 89 – 91 for Semiconductor Lead Layouts.

● Semiconductor Location

Ref. No.	Location
D202	E-21
D203	F-21
D204	E-16
D205	E-12
○ D401	F-3
○ D402	E-3
○ D403	F-3
○ D404	E-3
○ D405	F-3
○ D406	E-3
IC205	E-13
IC206	E-21
IC207	C-15
IC208	C-16
IC209	E-17
IC213	E-18
IC214	E-20
IC215	F-19
IC216	G-20
○ IC401	C-4
○ IC402	D-5
IC403	H-5
IC404	D-8
IC405	E-8
IC406	G-8
IC407	G-7
IC408	E-7
Q201	F-22
Q202	F-22
Q203	F-15
Q204	E-21
Q205	E-16
Q209	E-22
Q210	F-21
○ Q401	E-3
○ Q402	D-3
○ Q403	E-4
○ Q404	D-4

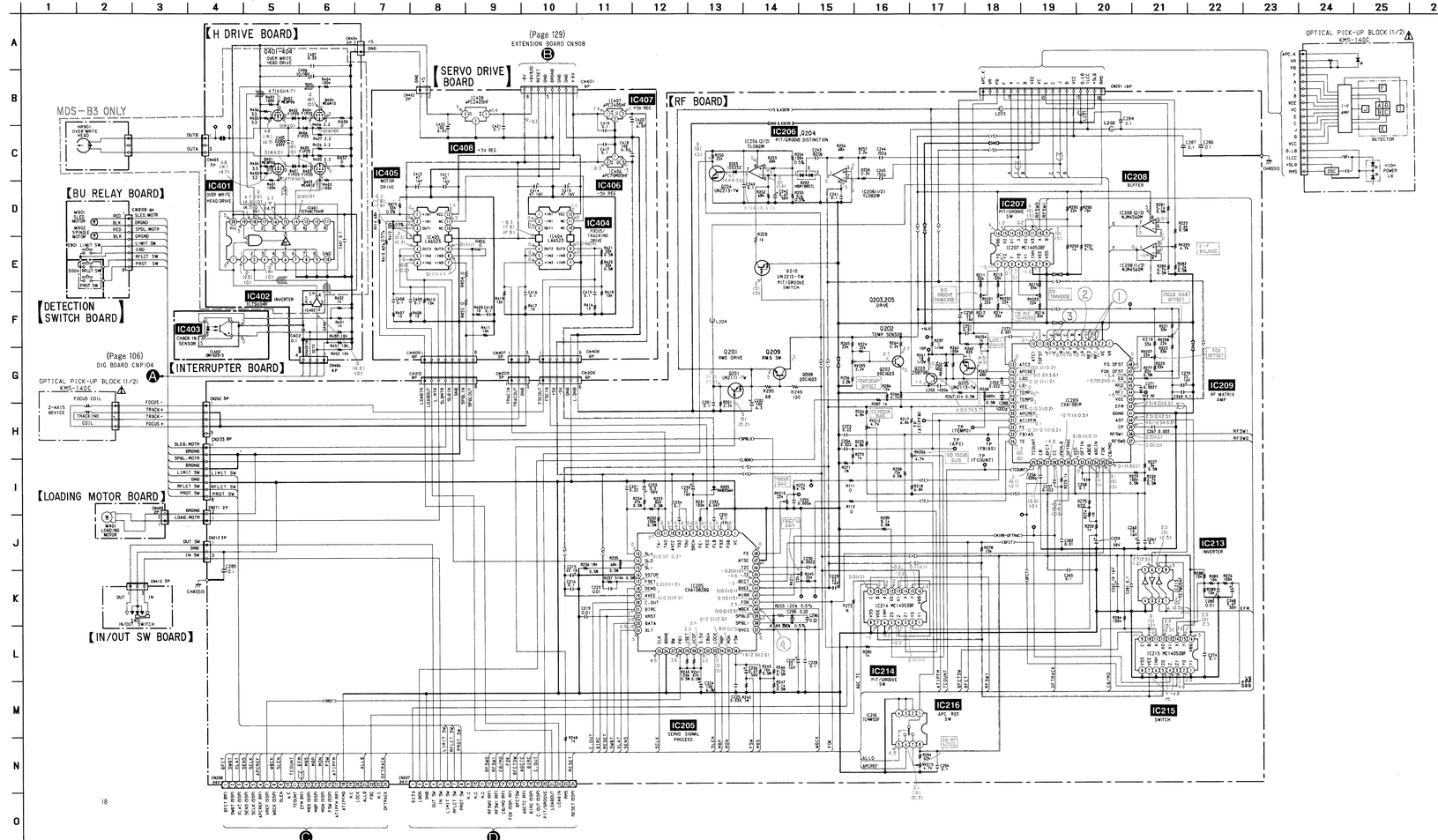
○ : MDS-B3 only



Note on Printed Wiring Board:

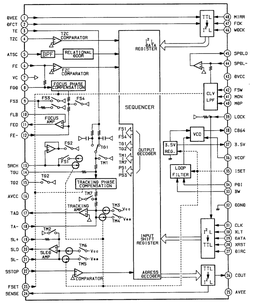
- ○—— : parts extracted from the component side.
- ● : Through hole.
- ▒▒▒ : Pattern on the side which is seen.
- ▒▒▒ : Pattern of the rear side.

7-5. SCHEMATIC DIAGRAM — RF Section —

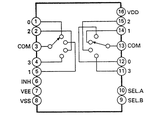


● IC Block Diagrams

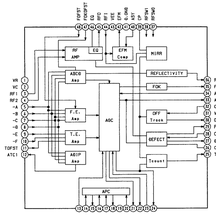
IC205 CXA1082BQ



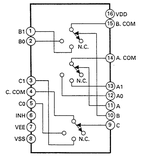
IC207 MC14052BF



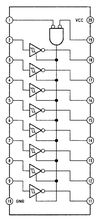
IC209 CXA1381R



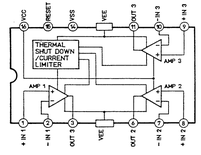
IC214, 215 MC14053BFP



IC401 TC74ACT540F (MDS-B3 only)



IC404, 405 LA6523



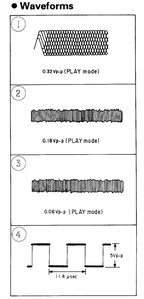
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- % : indicates tolerance.

Note:	**Note:**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

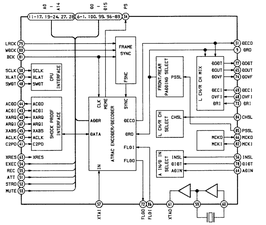
- ▭▭▭ : B+ Line
- ▭▭▭ : B− Line
- ▭▭▭ : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
  ( ) : REC
  〈 〉 : PB
  ✱ : Impossible to measure the voltage at the marked points.
- Voltages are taken with a VOM (Input Impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ▷ : PB
  ▶ : REC (MDS-B3 only)

● Waveforms

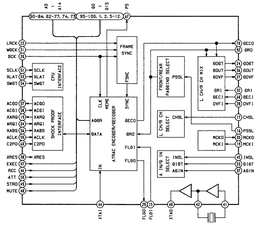


● IC Block Diagrams

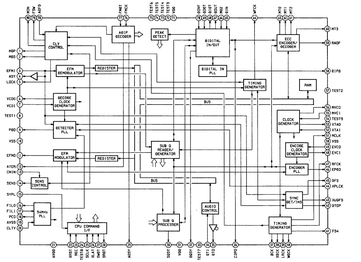
IC101 CXD2527R



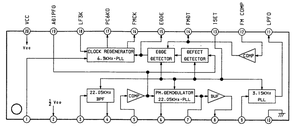
IC102 CXD2527R-1



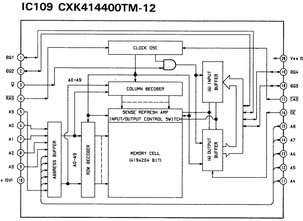
IC103 CXD2525R



IC161 CXA1380N



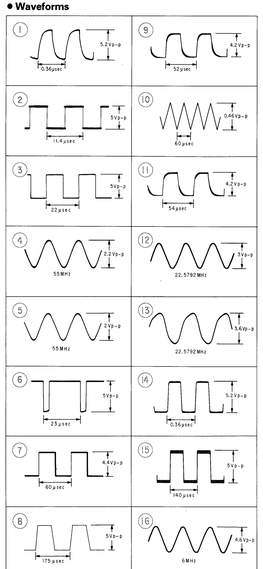
IC109 CXK414400TM-12



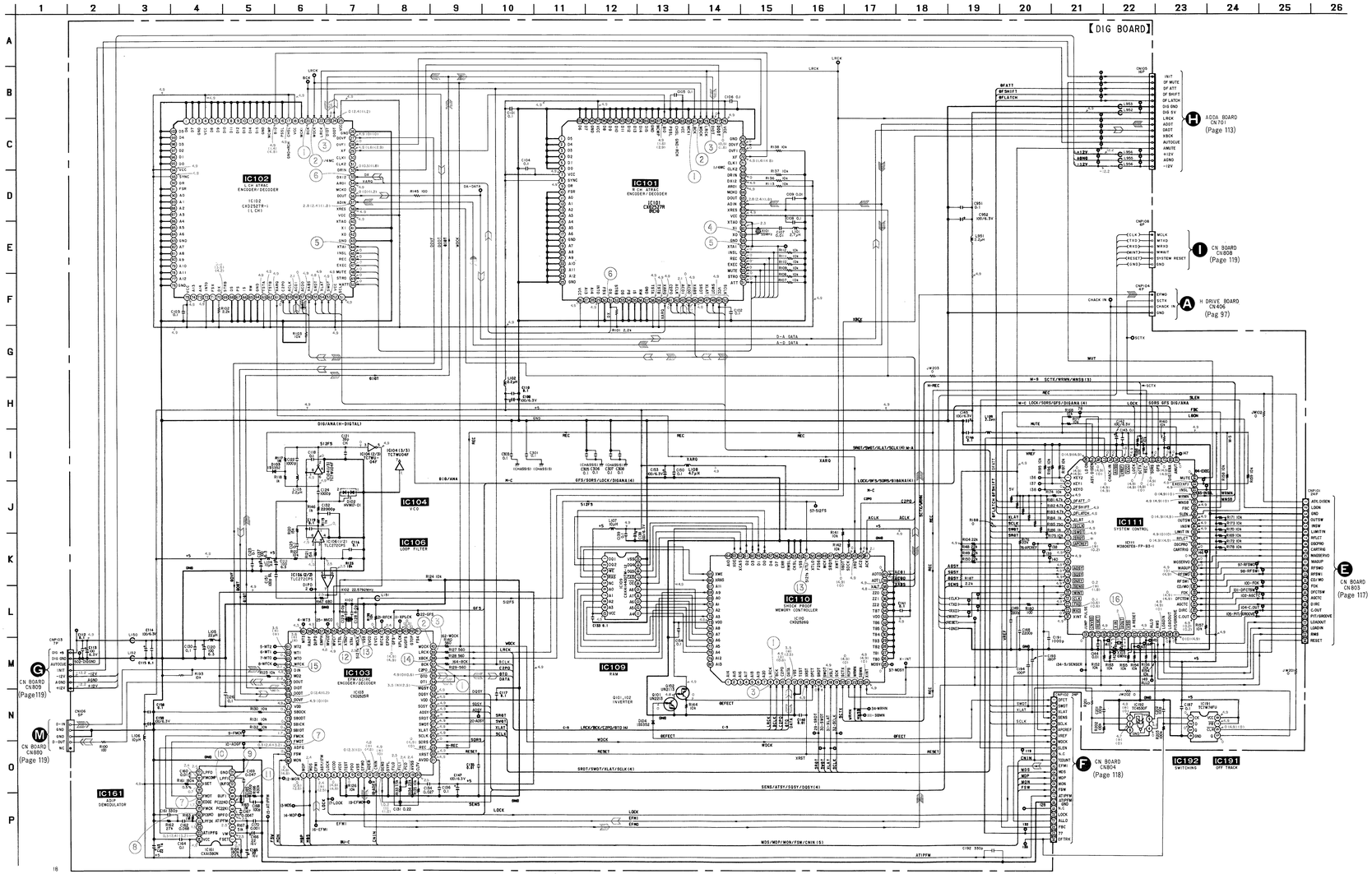
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantaliums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- % : indicates tolerance.
- △ : internal component.
- ⎓ : B+ Line
- ⎓ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
  ( ) : REC
  < > : PB
  ✽ : Impossible to measure the voltage at the marked points.
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ▷ : PB
  ▶ : REC (MDS-B3 only)
  ▷▷ : PB (Digital out)
  ▶▶ : REC (Digital in) (MDS-B3 only)

● Waveforms

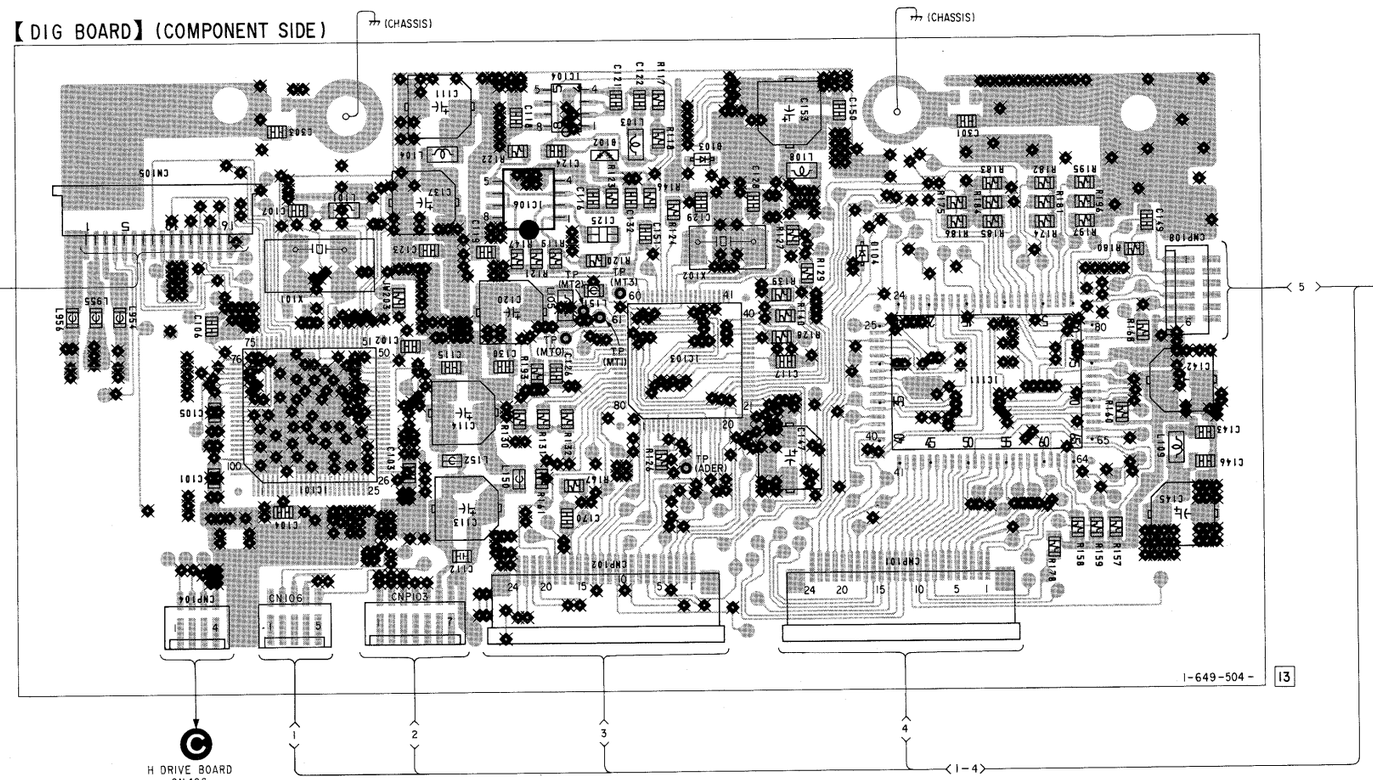


7-6. SCHEMATIC DIAGRAM — DIGITAL Section —

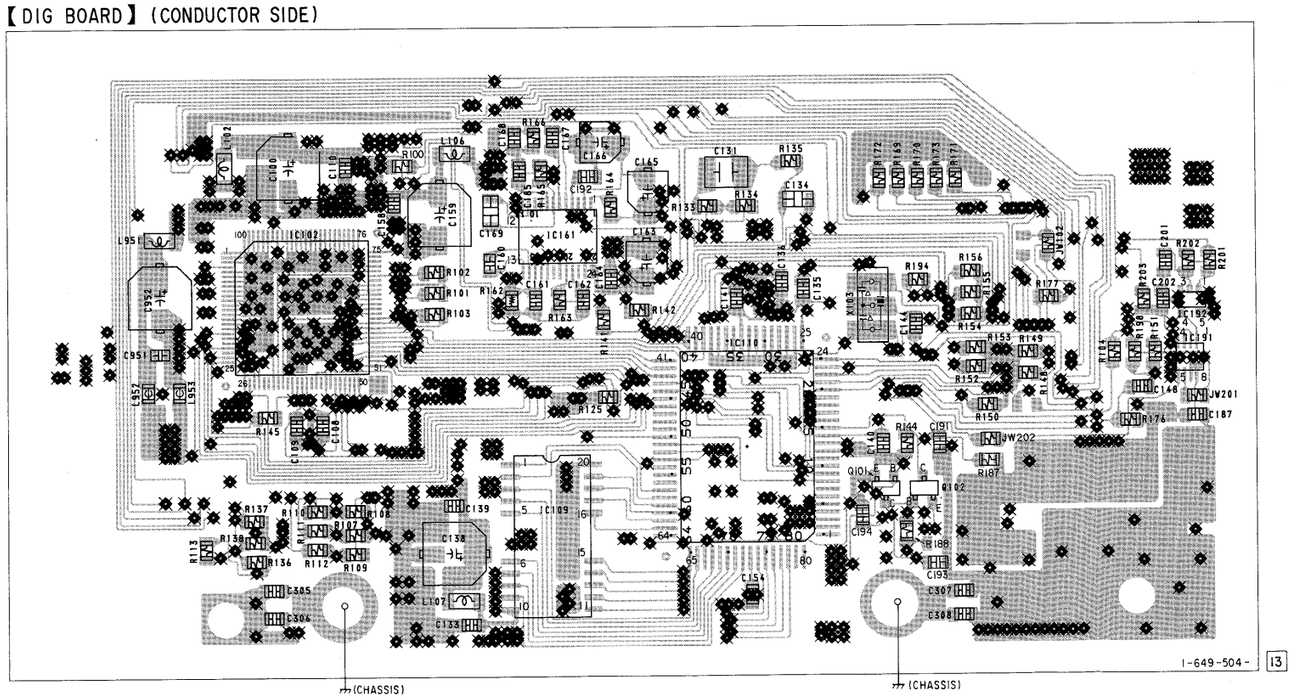

【DIG BOARD】
IC102 CXD2527R-1 (L CH) ENCODER/DECODER
IC101 CXD2527R (R CH) ENCODER/DECODER
IC104 VCO
IC106 LOOP FILTER
IC103 CXD2525R ENCODER/DECODER
IC109 RAM
IC110 ERROR PROOF MEMORY CONTROLLER
IC111 SYSTEM CONTROL
IC161 ADD DEMODULATOR
IC192 SWITCHES
IC191 OPT TRAY
H ADDA BOARD CN701 (Page 113)
I CN BOARD CN808 (Page 119)
A H DRIVE BOARD CN406 (Pag 97)
E CN BOARD CN803 (Page 117)
F CN BOARD CN804 (Page 118)
G CN BOARD CN809 (Page119)
M CN BOARD CN880 (Page 119)

● See page 84 for Circuit Boards Location, 89 – 91 for Semiconductor Lead Layouts.

【DIG BOARD】(COMPONENT SIDE)



【DIG BOARD】(CONDUCTOR SIDE)



● **Semiconductor Location**

Ref. No.	Location
D102	B-5
D103	B-6
D104	B-7
IC101	D-3
IC102	H-3
IC103	C-6
IC104	A-5
IC106	B-5
IC109	I-5
IC110	H-6
IC111	C-7
IC161	H-5
IC191	H-9
IC192	H-9
Q101	I-7
Q102	I-7

Note on Printed Wiring Board:

- ○—— : parts extracted from the component side.
- ✿ : Through hole.
- ▒ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

- The DIG board is of 4-layers structure, but the patterns of intermediate layers (second and third layers) are not shown.

7-8. PRINTED WIRING BOARDS — A/D, D/A Converter Section —

● See page 84 for Circuit Boards Location, 89 – 91 for Semiconductor Lead Layouts.

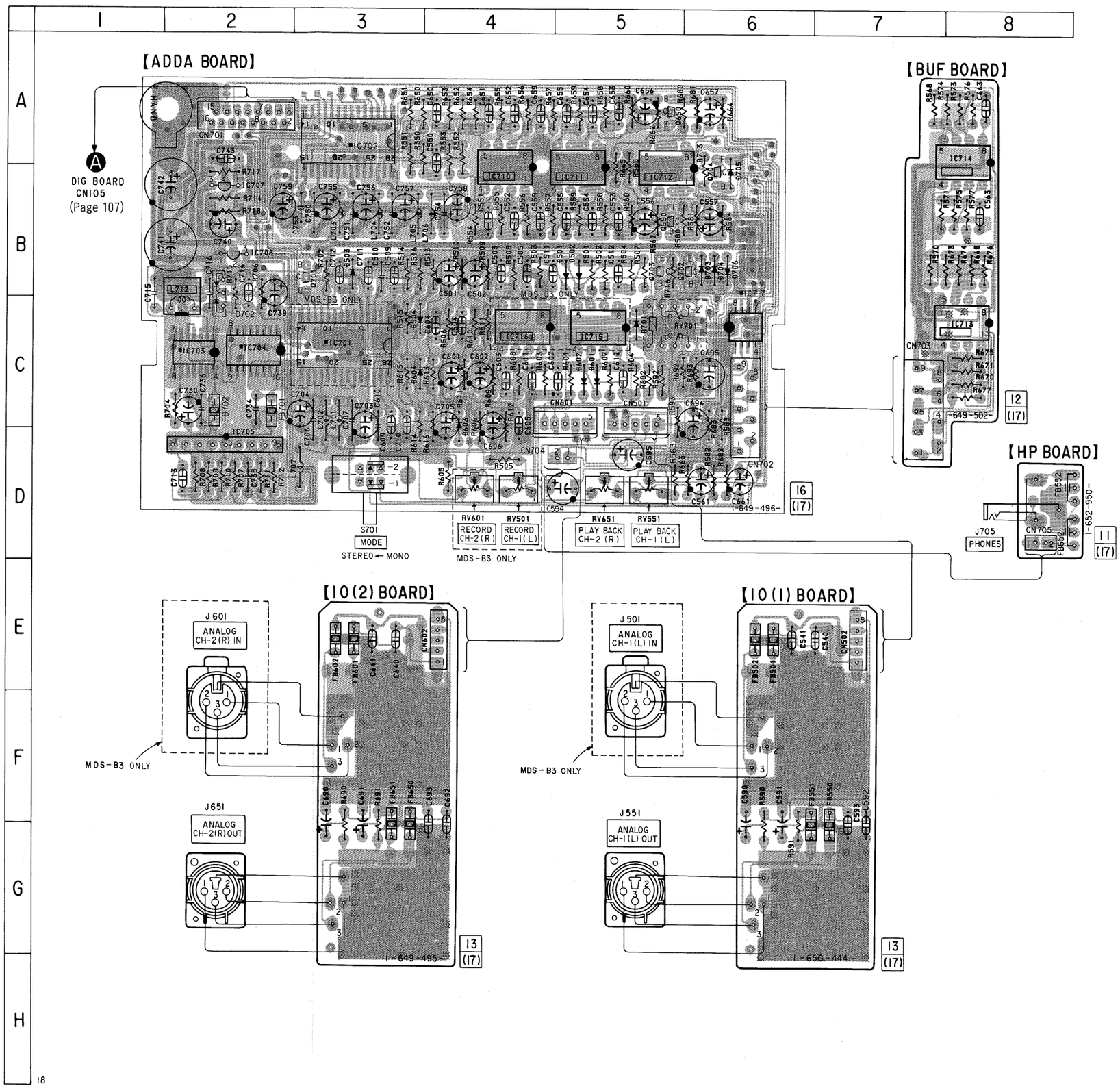
● **Semiconductor Location**

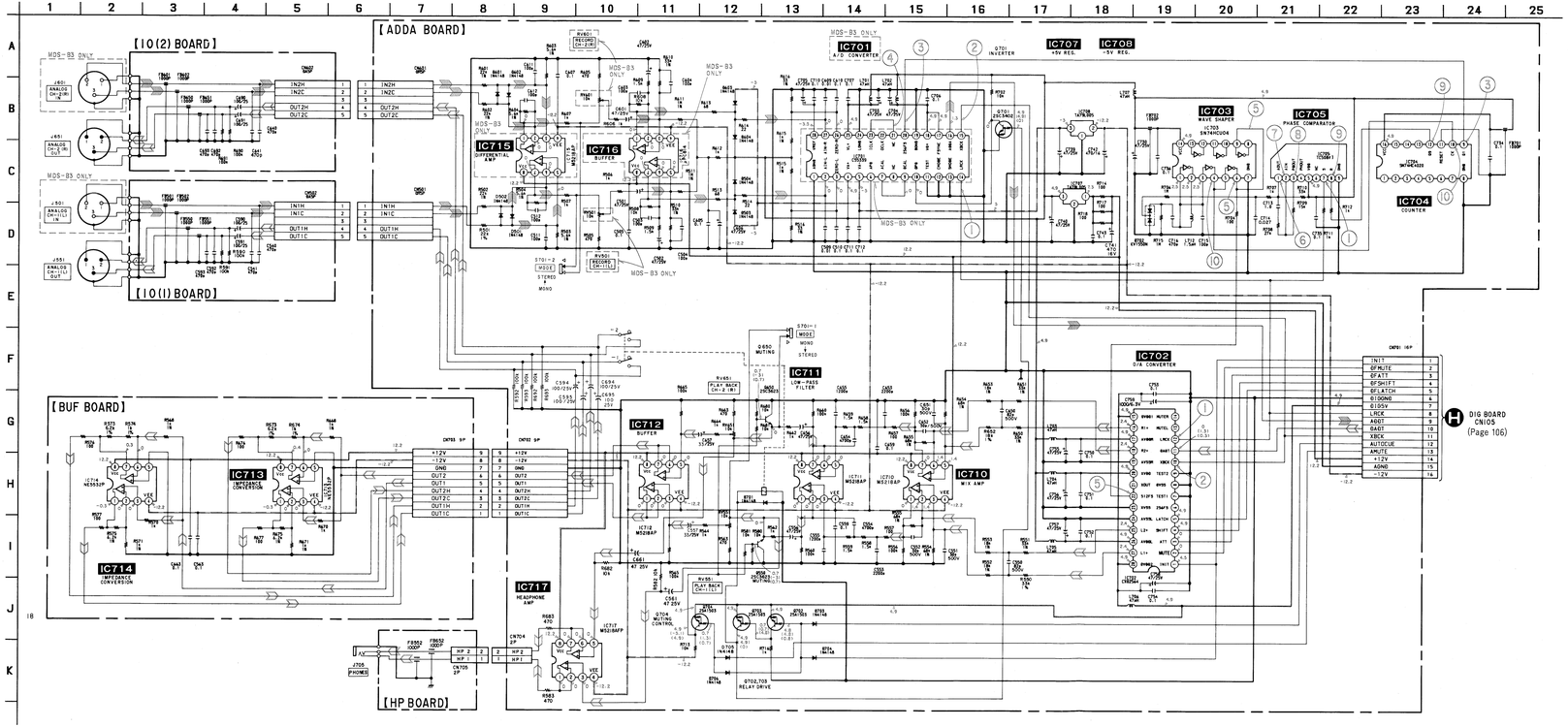
Ref. No.	Location
D501	B-5
D502	B-5
D503	B-3
D504	C-3
D601	C-5
D602	C-5
D603	C-4
D604	C-3
D701	C-5
D702	C-2
D703	B-6
D704	B-6
D705	B-6
D706	B-6
○IC701	C-3
IC702	A-3
IC703	C-2
IC704	C-2
IC705	D-2
IC707	B-2
IC708	B-2
IC710	A-4
IC711	A-5
IC712	A-5
IC713	C-8
IC714	A-8
○IC715	C-5
○IC716	C-4
IC717	C-6
Q550	B-5
Q650	A-5
Q701	B-3
Q702	B-6
Q703	B-5
Q704	B-6

○ : MDS-B3 only

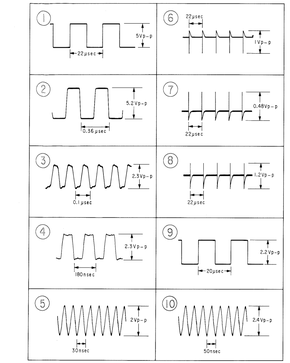
Note on Printed Wiring Board:

- ○—— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.
- [ ]— indicates side identified with part number.
- ◎ , ● : Through hole.
- ▨ : Pattern on the side which is seen.
- ▨ : Pattern of the rear side.





● Waveforms

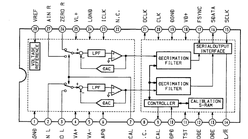


Note on Schematic Diagram:

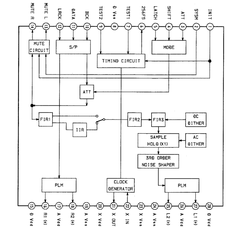
- All capacitors are in μF unless otherwise noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- % : indicates tolerance.
- ⏚ : B+ Line
- ⏚ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
  ( ) : REC
  < > : PB
- Voltages are taken with a VOM (Input impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⋁ : PB
  ⋀ : REC (MDS-B3 only)

● IC Block Diagrams

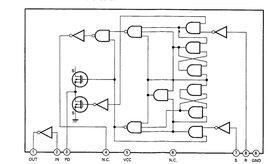
IC701 CS5339-KS (MDS-B3 only)



IC702 CXD2564AM

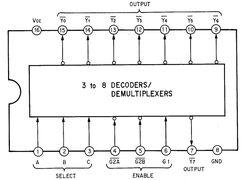


IC705 TC5081AP

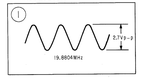


● IC Block Diagram

IC353 SN74HCT138ANS

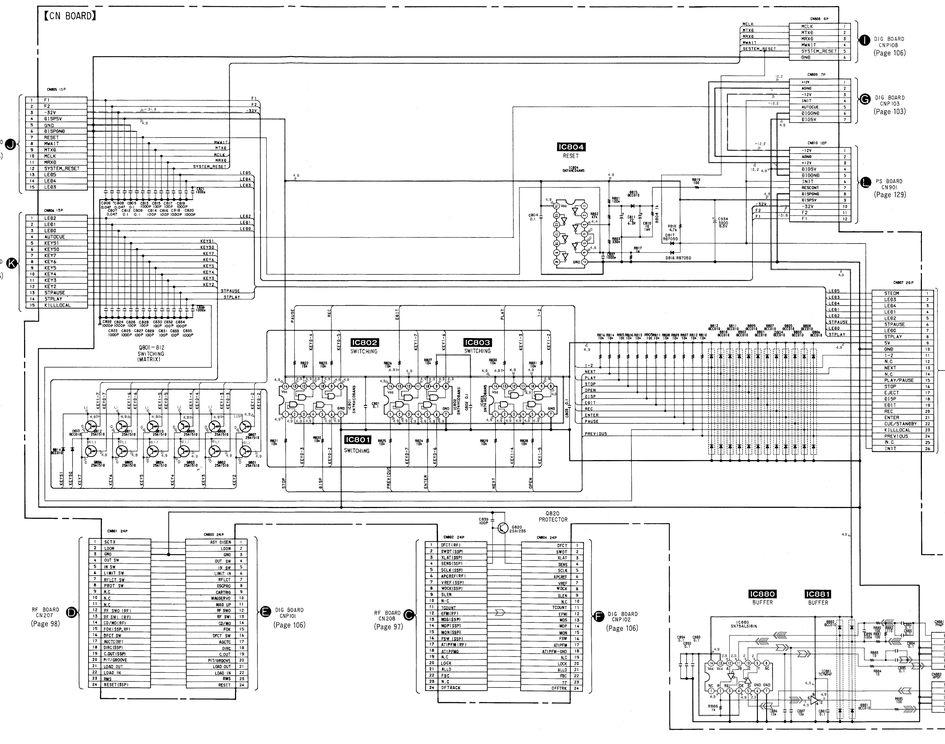


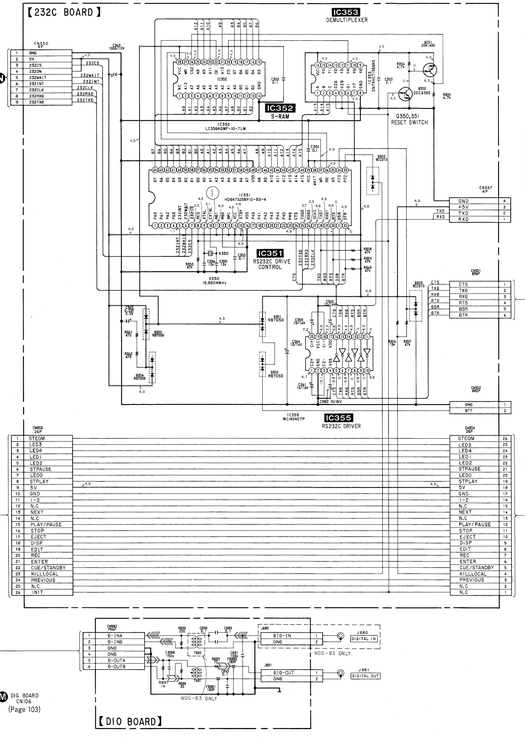
● Waveform

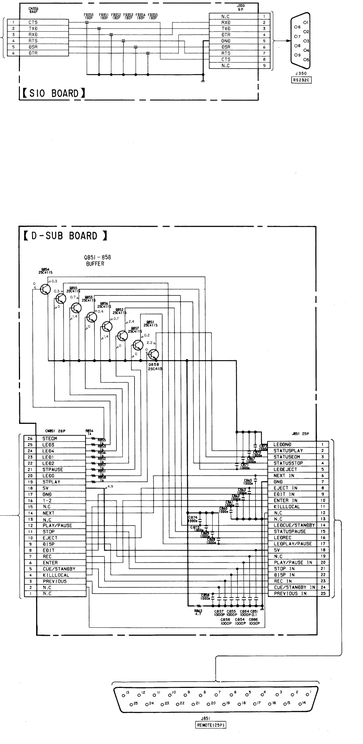


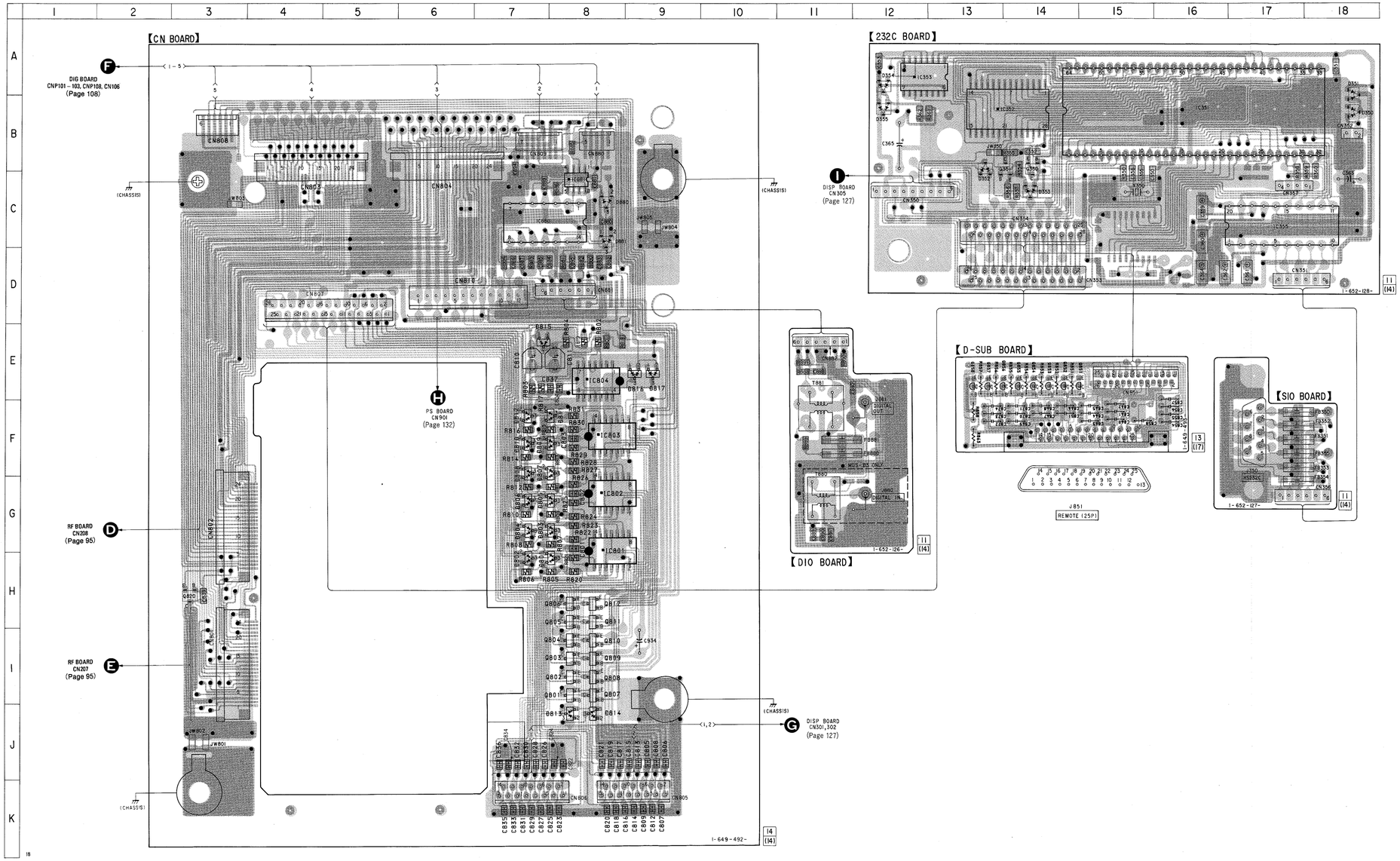
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- ⏚ : B+ Line
- ⏚ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  - ⋙ : PB
  - ⋙ : PB (Digital in)
  - ⋙ : REC (Digital out) (MDS-B3 only)









● Semiconductor Location

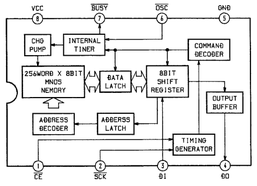
Ref. No.	Location
D350	B- 18
D351	A- 18
D352	C- 13
D353	C- 14
D354	A- 12
D355	B- 12
D801	H- 8
D802	H- 7
D803	G- 8
D804	G- 7
D805	G- 8
D806	G- 7
D807	F- 8
D808	F- 7
D809	F- 8
D810	F- 7
D811	F- 8
D812	F- 7
D813	J- 8
D814	J- 8
D815	E- 7
D816	E- 9
D817	E- 9
D880	C- 8
D881	C- 8
IC351	B- 16
IC352	B- 13
IC353	A- 12
IC355	C- 17
IC801	G- 8
IC802	G- 8
IC803	F- 8
IC804	E- 8
IC880	C- 7
IC881	C- 8
Q350	B- 14
Q351	B- 14
Q801	I- 8
Q802	I- 8
Q803	I- 8
Q804	I- 8
Q805	H- 8
Q806	H- 8
Q807	I- 8
Q808	I- 8
Q809	I- 8
Q810	I- 8
Q811	H- 8
Q812	H- 8
Q820	H- 3
Q851	E- 14
Q852	E- 14
Q853	E- 14
Q854	E- 14
Q855	E- 14
Q856	E- 13
Q857	E- 13
Q858	E- 13

Note on Printed Wiring Board:

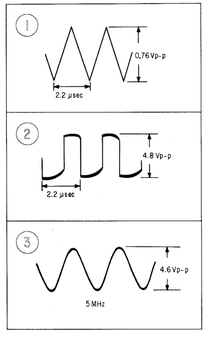
- ○—— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.
- ● : Through hole.
- ▨ : Pattern on the side which is seen.
- ▨ : Pattern of the rear side.

7-12. SCHEMATIC DIAGRAM — DISPLAY Section —

● IC Block Diagram
IC304 CXK1013P

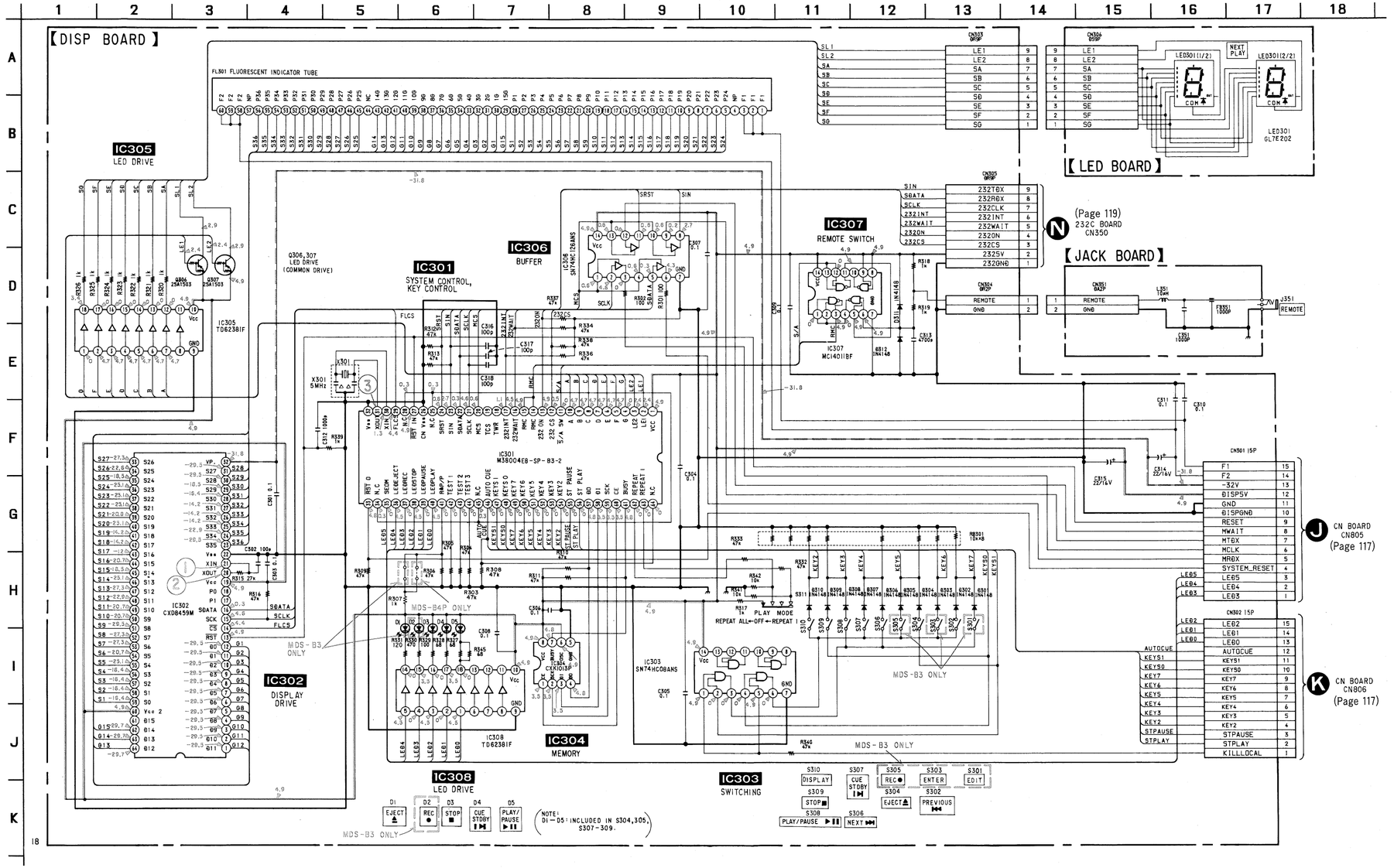


● Waveforms



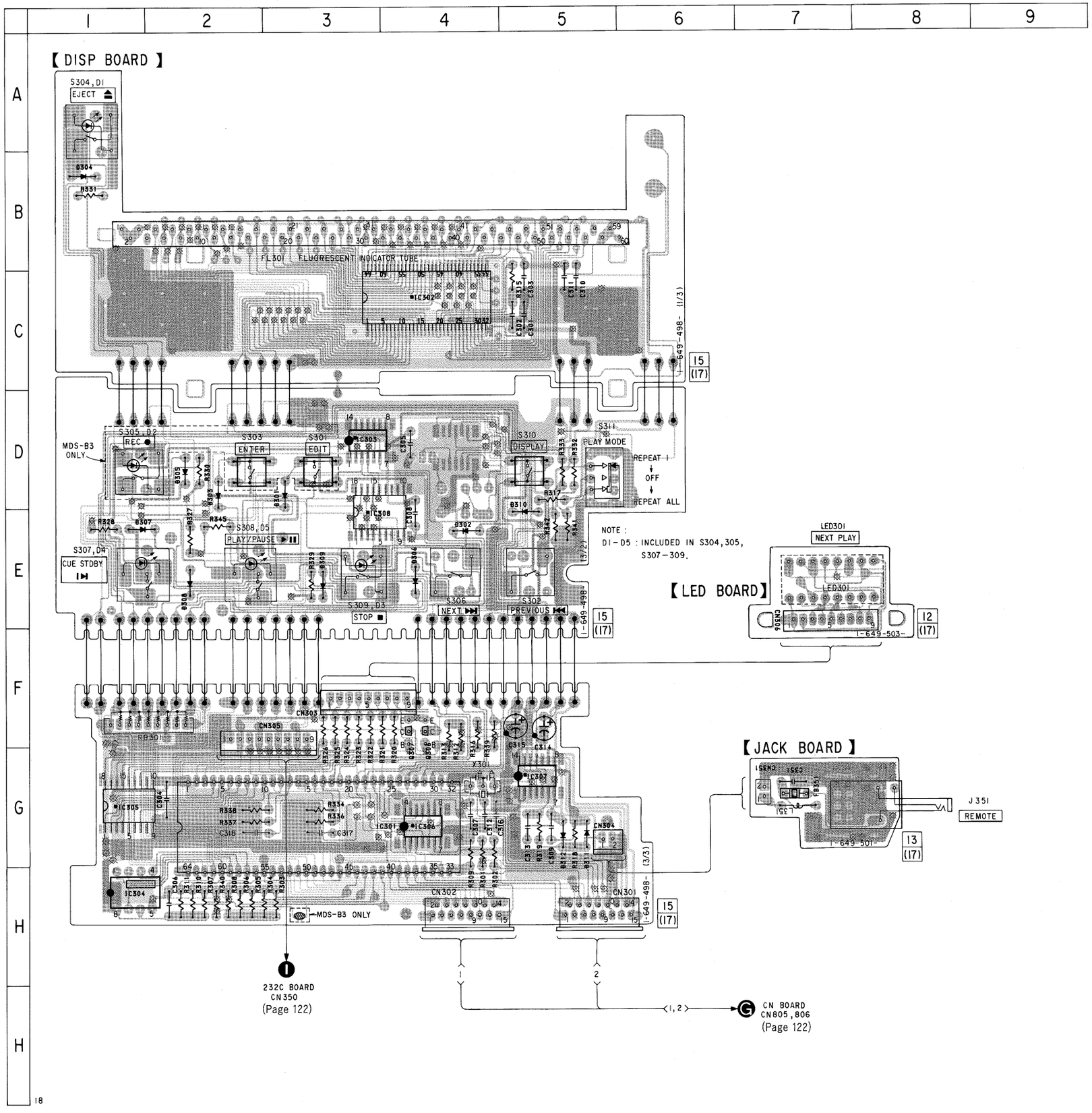
Note on Schematic Diagram:

- All capacitors are in µF unless otherwise noted. pF: µµF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- △ : internal component.
- ▭ : B+ Line
- ▭ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.



7-13. PRINTED WIRING BOARDS — DISPLAY Section —

● See page 84 for Circuit Boards Location, 89 – 91 for Semiconductor Lead Layouts.



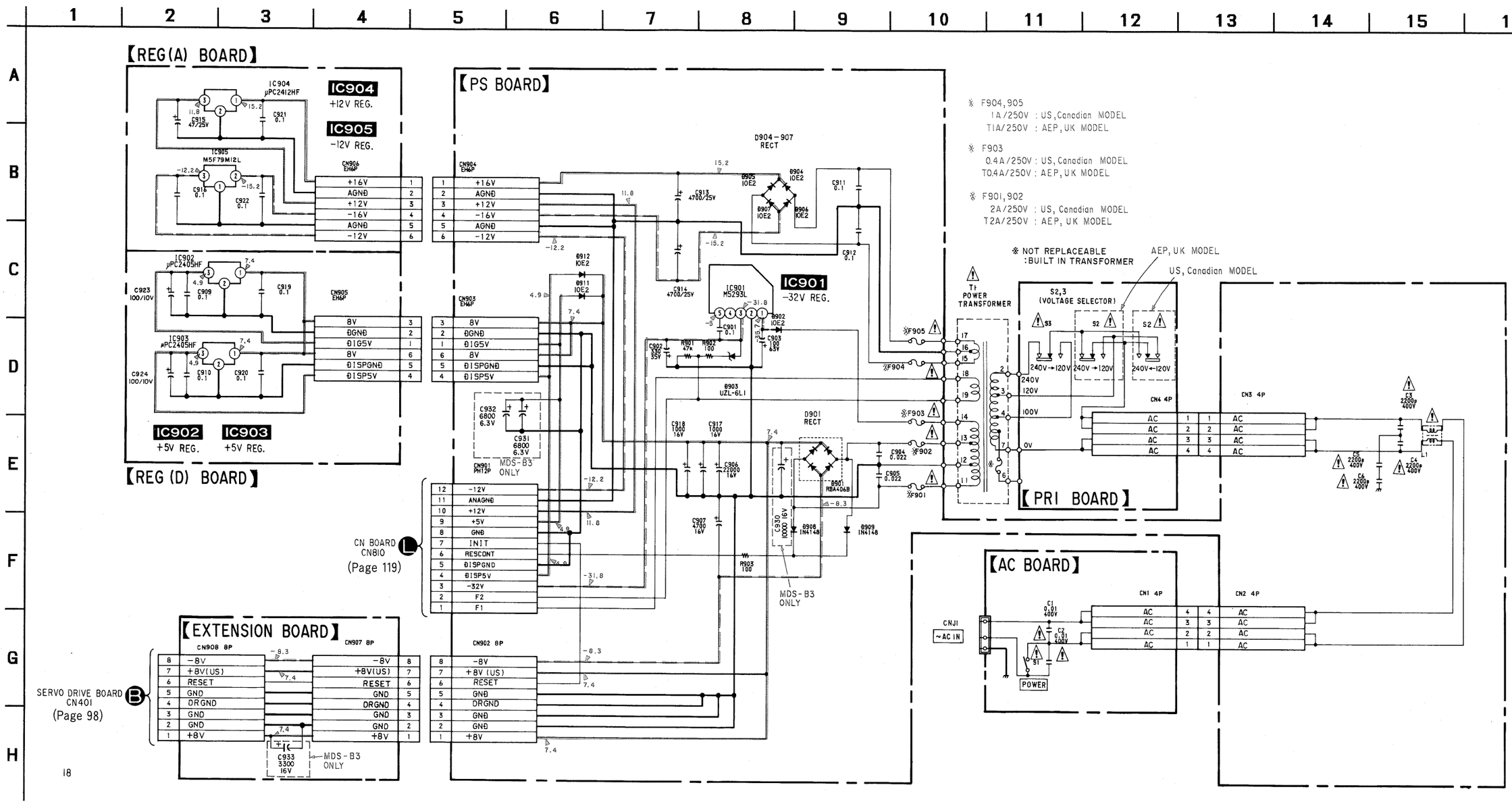
● **Semiconductor Location**

Ref. No.	Location
D301	D-3
D302	E-4
D303	D-2
D304	B-1
D305	D-2
D306	E-4
D307	E-1
D308	E-2
D309	E-3
D310	E-5
D311	G-5
D312	G-5
IC301	G-3
IC302	C-4
IC303	D-3
IC304	H-1
IC305	G-1
IC306	G-4
IC307	G-5
IC308	E-3
LED301	E-7
Q306	F-4
Q307	F-4

Note on Printed Wiring Board:

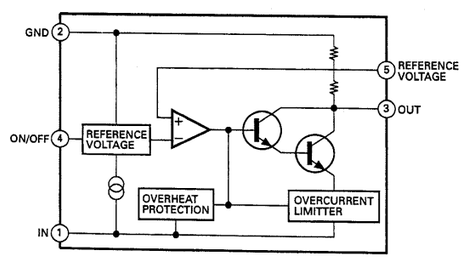
- ○—— : parts extracted from the component side.
- ● ■ : parts mounted on the conductor side.
- ◎ ⊗ : Through hole.
- ● ▒▒ : Pattern on the side which is seen.
- ◎ ▒▒ : Pattern of the rear side.

7-14. SCHEMATIC DIAGRAM — POWER SUPPLY Section —



● IC Block Diagram

IC901 M5293L



Note on Schematic Diagram:

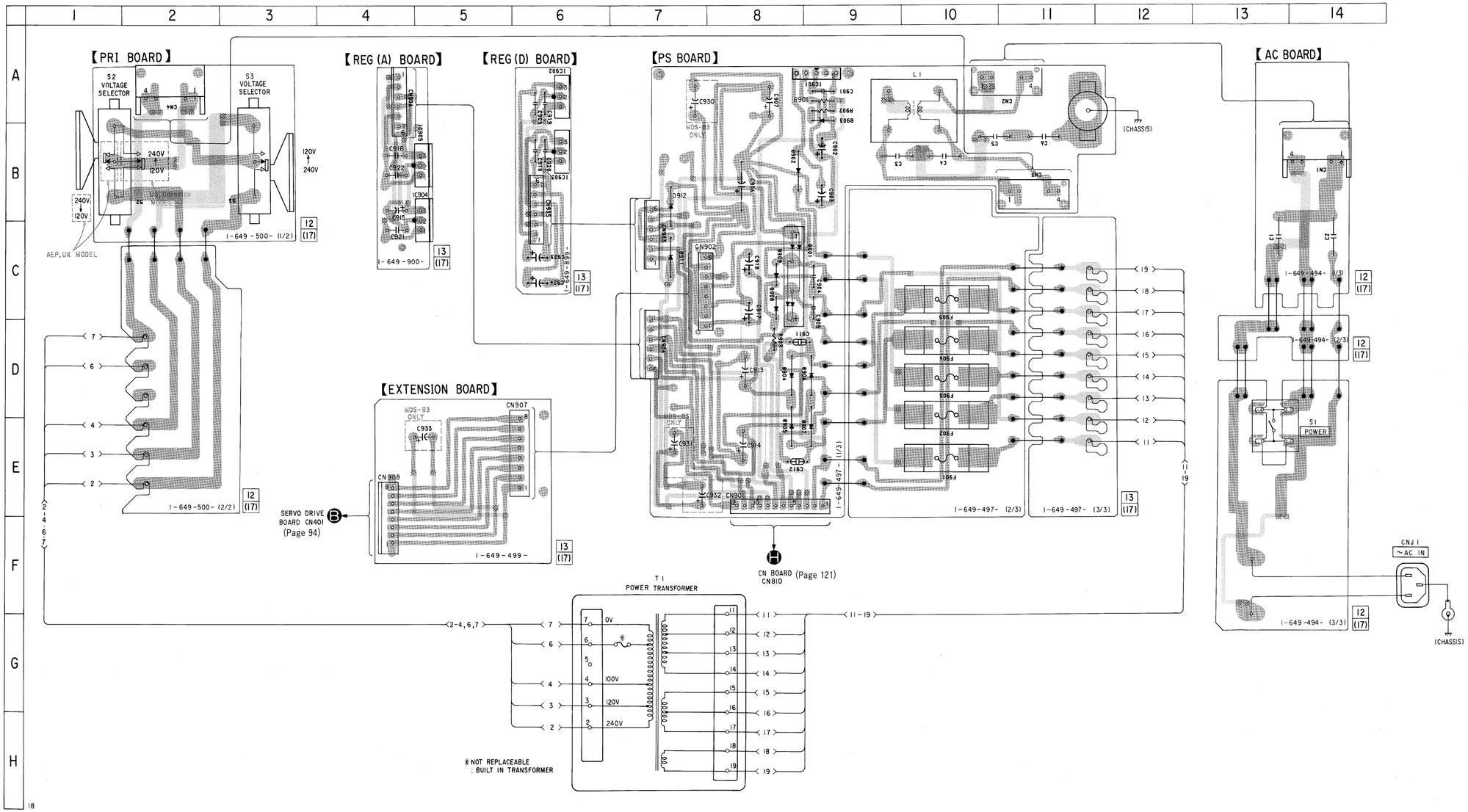
- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.

Note:	**Note:**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- ▭▭▭ : B+ Line
- ▭▭▭ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.

7-15. PRINTED WIRING BOARDS — POWER SUPPLY Section —

● See page 84 for Circuit Boards Location, 89 – 91 for Semiconductor Lead Layouts.



● **Semiconductor Location**

Ref. No.	Location
D901	C-9
D902	B-8
D903	A-9
D904	D-8
D905	E-8
D906	D-9
D907	E-9
D908	C-8
D909	C-8
D911	C-7
D912	B-7
IC901	A-9
IC902	A-6
IC903	B-6
IC904	B-4
IC905	B-5

Note on Printed Wiring Board:

- ● ——○ : parts extracted from the component side.
- ○ ⊗ : Through hole.
- ● ▨ : Pattern on the side which is seen.
- ○ ▨ : Pattern of the rear side.

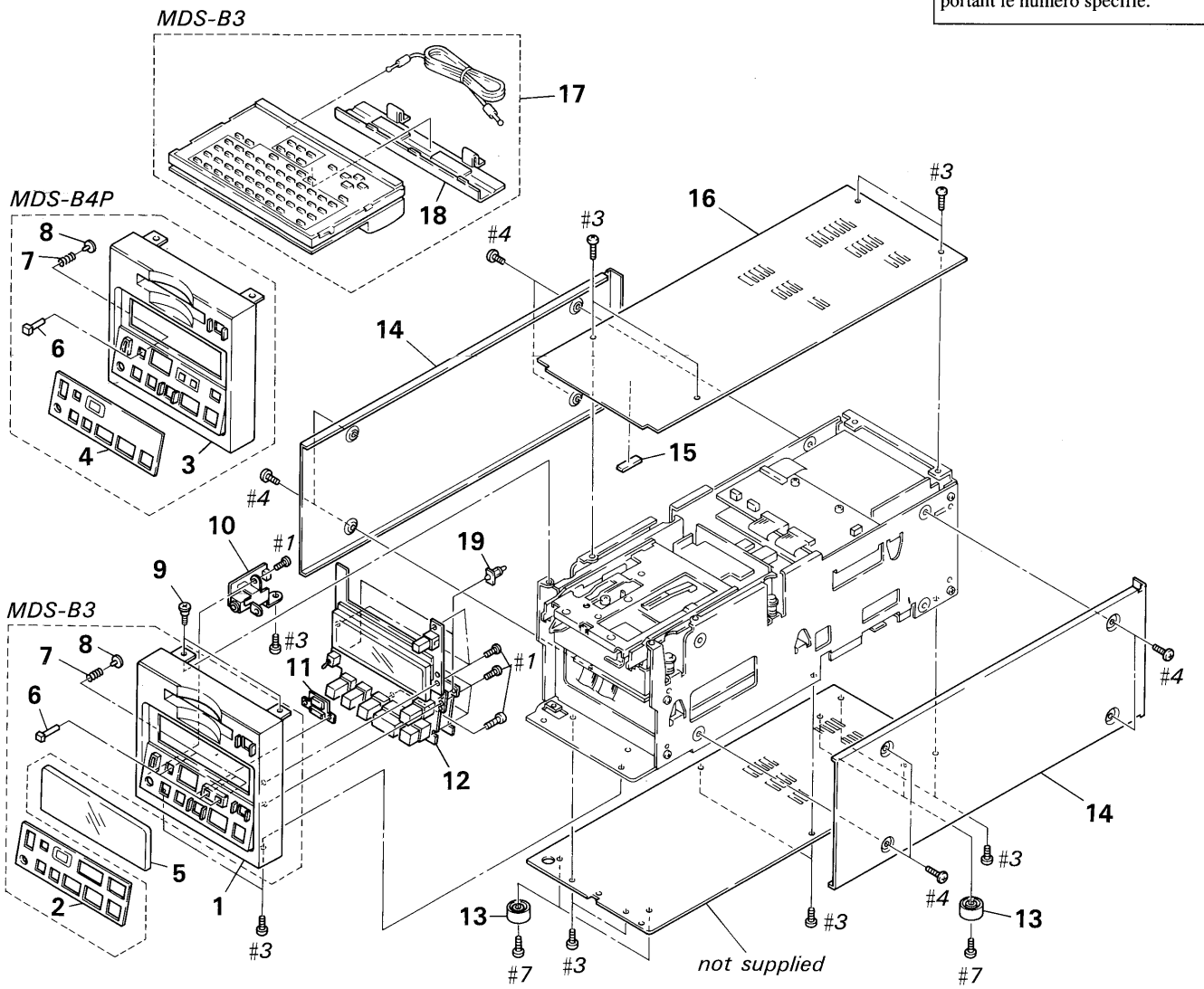
SECTION 8
EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (#mark) list and accessories and packing materials are given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les components identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

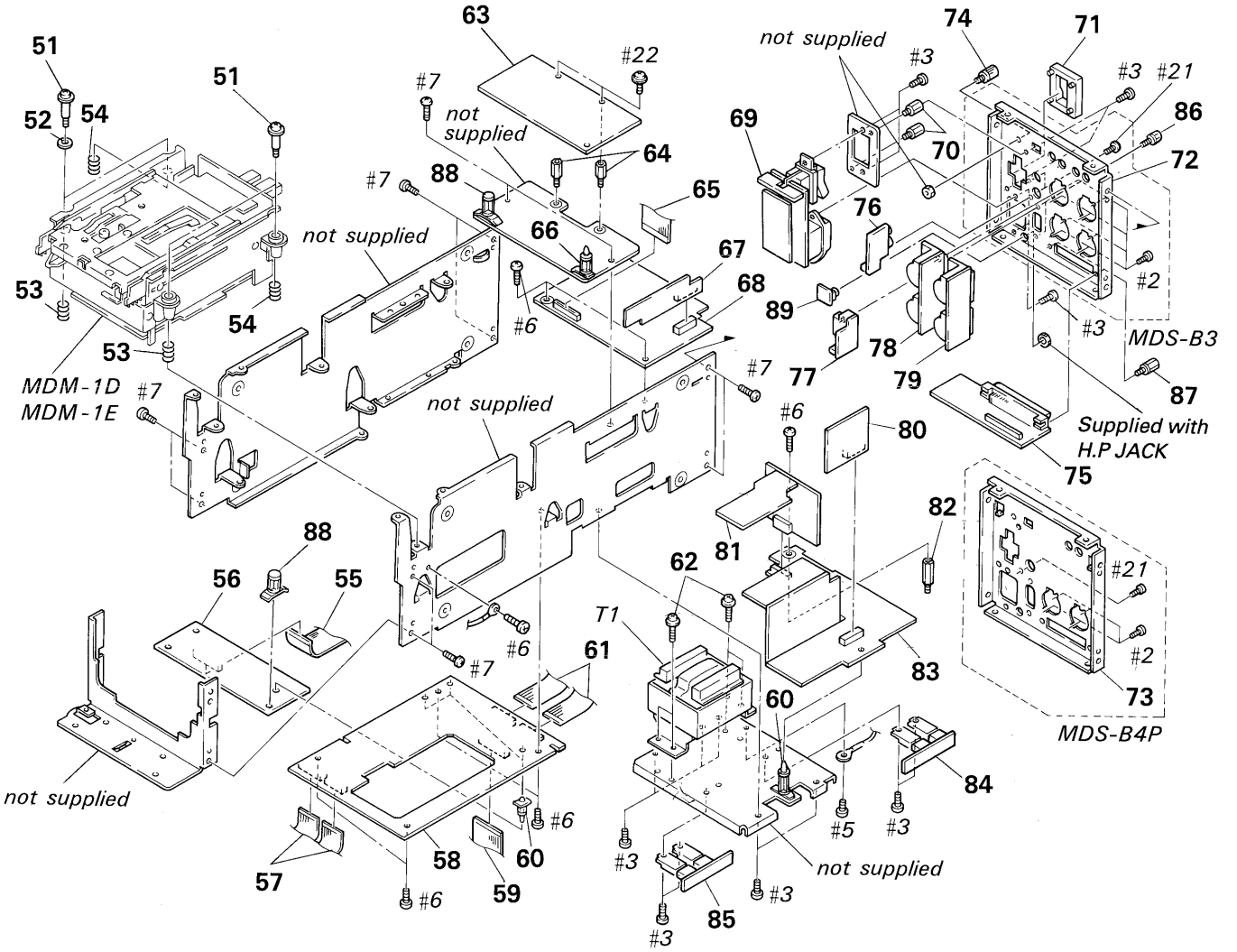
8-1. CABINET SECTION



Ref. No.	Part No.	Description	Remark
1	X-4944-771-1	PANEL ASSY, FRONT (MDS-B3)	
2	3-906-063-01	SHEET (MDS-B3)	
3	X-4944-772-1	PANEL ASSY, FRONT (MDS-B4P)	
4	3-906-063-12	SHEET (MDS-B4P)	
5	3-906-064-01	WINDOW (FL TUBE)	
6	3-906-065-01	BUTTON	
* 7	3-567-099-01	SPRING, COMPRESSION	
8	3-668-009-02	PIN, PUSH BUTTON (MDS-B3)	
9	2-236-956-00	SCREW, STEP	
* 10	1-649-501-11	JACK BOARD	

Ref. No.	Part No.	Description	Remark
* 11	1-649-503-11	LED BOARD	
* 12	A-4673-146-A	DISP BOARD, COMPLETE (MDS-B3)	
* 12	A-4673-157-A	DISP BOARD, COMPLETE (MDS-B4P)	
13	4-927-849-01	FOOT	
* 14	4-936-675-21	PLATE (R), SIDE	
* 15	4-911-041-01	CUSHION, RUBBER	
* 16	3-906-060-01	CASE	
17	1-467-284-11	REMOTE COMMANDER (RM-DC1) (MDS-B3)	
18	4-395-504-01	COVER, BATTERY (RM-DC1) (MDS-B3)	
19	3-703-353-03	SUPPORT, PC BOARD	

8-2. CHASSIS SECTION

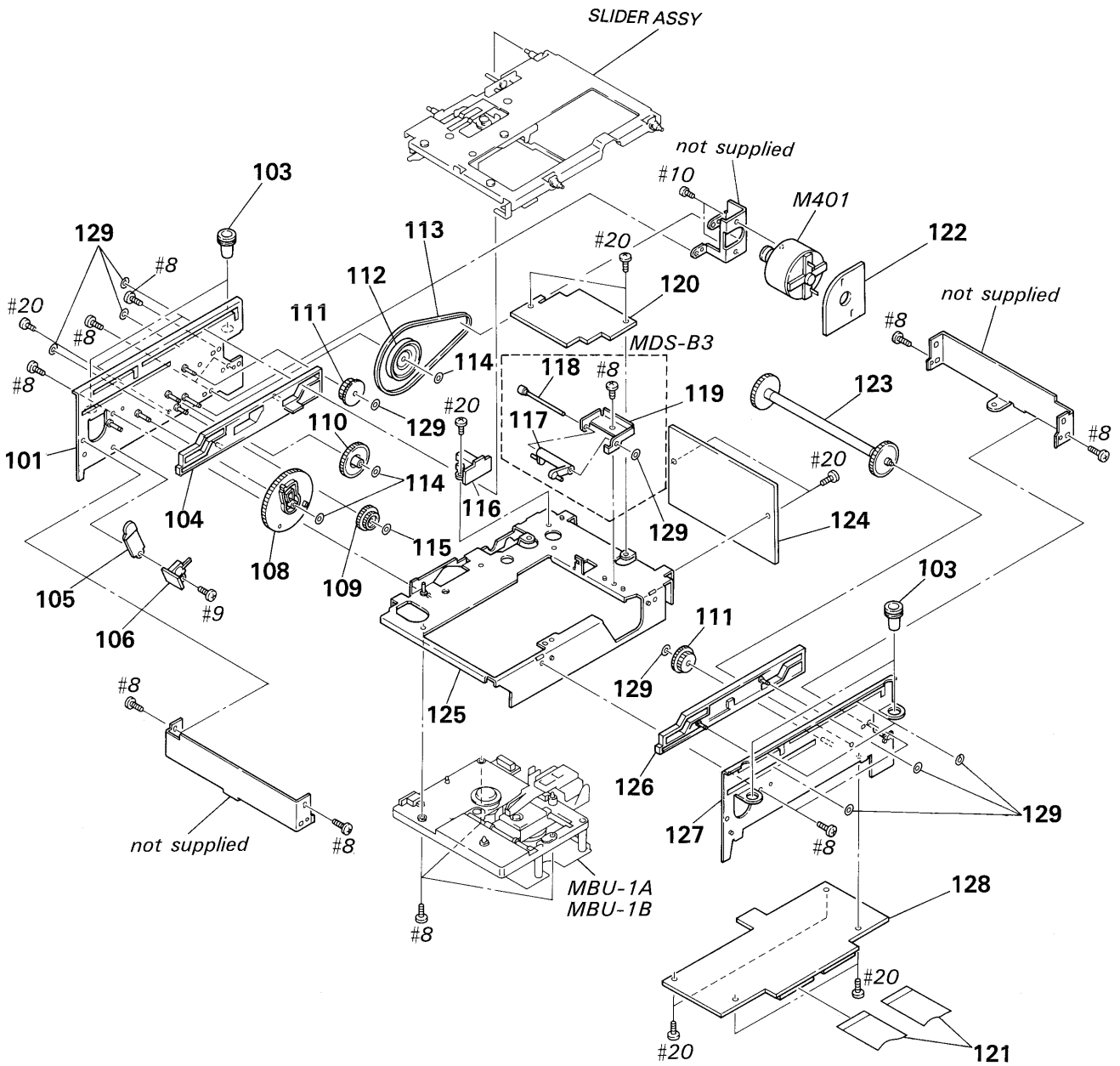


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les components identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
51	4-955-097-12	SCREW (C), TRANSPORT	
52	4-958-120-01	BUSHING (DAMPER)	
* 53	4-958-087-01	SPRING (FRONT), COMPRESSION	
* 54	4-958-088-01	SPRING (REAR), COMPRESSION	
55	1-751-780-11	WIRE (FLAT TYPE) (26 CORE)	
* 56	A-4673-106-A	232C BOARD, COMPLETE	
57	1-751-781-11	WIRE (FLAT TYPE) (15 CORE)	
* 58	A-4673-105-A	CN BOARD, COMPLETE	
59	1-765-253-11	WIRE (FLAT TYPE) (26 CORE)	
* 60	4-924-098-31	HOLDER, PC BOARD	
61	1-751-830-11	WIRE (FLAT TYPE) (24 CORE)	
62	4-886-821-11	SCREW, S TIGHT, +PTTWH 3X6	
* 63	A-4673-103-A	DIG BOARD, COMPLETE	
* 64	4-886-542-00	SUPPORT	
65	1-751-782-11	WIRE (FLAT TYPE) (16 CORE)	
66	3-703-353-03	SUPPORT, PC BOARD	
* 67	1-649-502-11	BUF BOARD	
* 68	A-4673-147-A	ADDA BOARD, COMPLETE (MDS-B3)	
* 68	A-4673-155-A	ADDA BOARD, COMPLETE (MDS-B4P)	
* 69	1-649-494-11	AC BOARD	
70	3-906-061-01	SPACER (SW)	

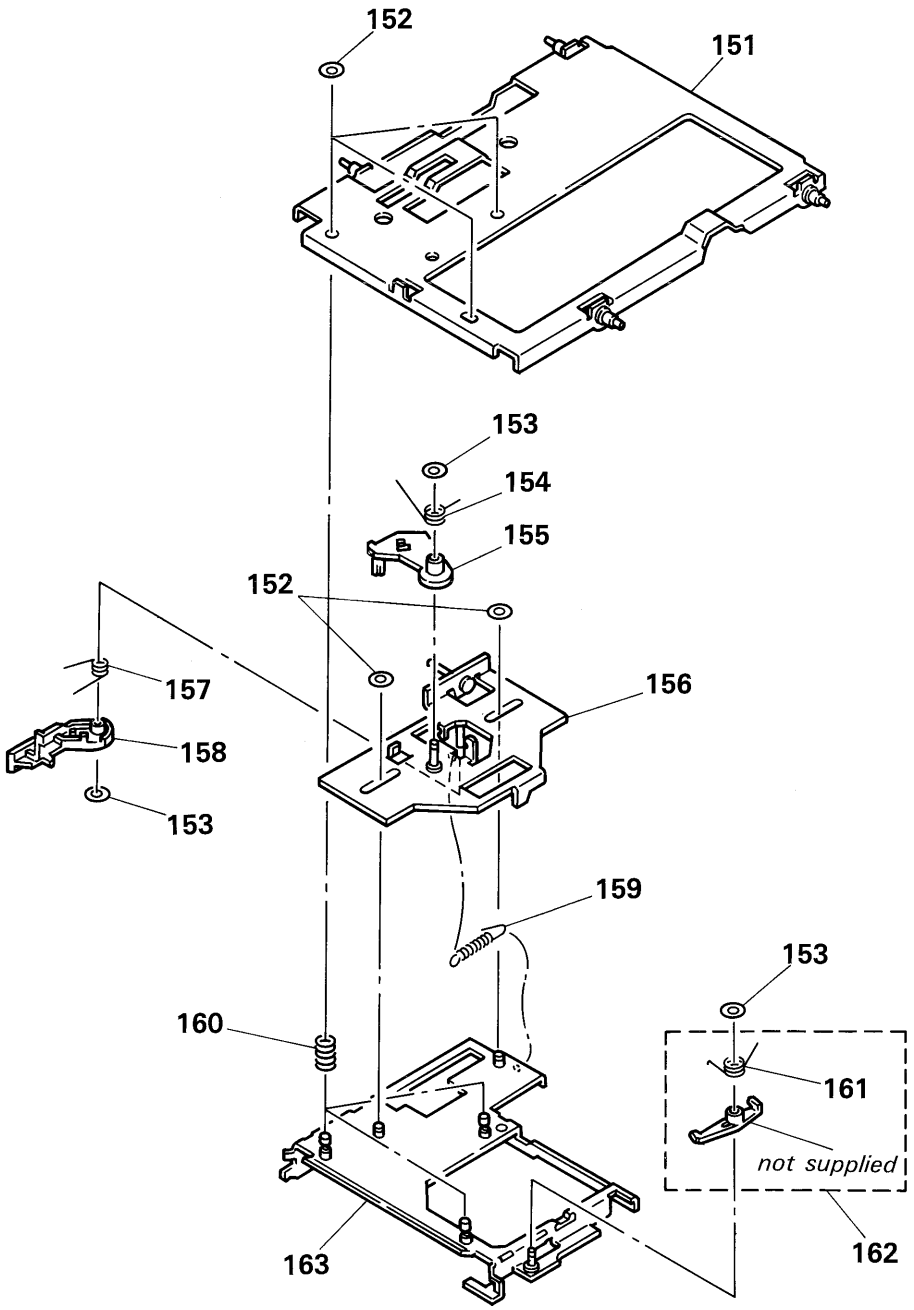
Ref. No.	Part No.	Description	Remark
71	2-251-642-01	GUARD, POWER SWITCH	
* 72	3-906-057-21	PANEL, BACK (MDS-B3)	
* 73	3-906-057-31	PANEL, BACK (MDS-B4P)	
* 74	X-4801-204-0	TERMINAL ASSY	
* 75	1-649-493-11	D-SUB BOARD	
* 76	1-652-126-11	DIO BOARD	
* 77	1-652-127-11	SIO BOARD	
* 78	1-649-495-11	IO (2) BOARD	
* 79	1-650-444-11	IO (1) BOARD	
* 80	1-649-499-11	EXTENSION BOARD	
* 81	1-649-500-11	PRI BOARD	
82	3-897-313-01	BOSS (17.2), RELAY	
* 83	A-4649-829-A	PS BOARD, COMPLETE (MDS-B4P)	
* 83	A-4673-166-A	PS BOARD, COMPLETE (MDS-B3)	
* 84	1-649-899-11	REG (D) BOARD	
* 85	1-649-900-11	REG (A) BOARD	
86	4-966-895-01	SCREW, HEXAGON	
87	3-387-373-01	SCREW (M2.6), HEXAGON	
* 88	3-670-570-31	SPACER, SUPPORT	
* 89	1-652-950-11	HP BOARD	
⚠T1	1-426-898-12	TRANSFORMER, POWER	

8-3. MECHANISM DECK SECTION-1
(MDS-B3 : MDM-1D
MDS-B4P : MDM-1E)



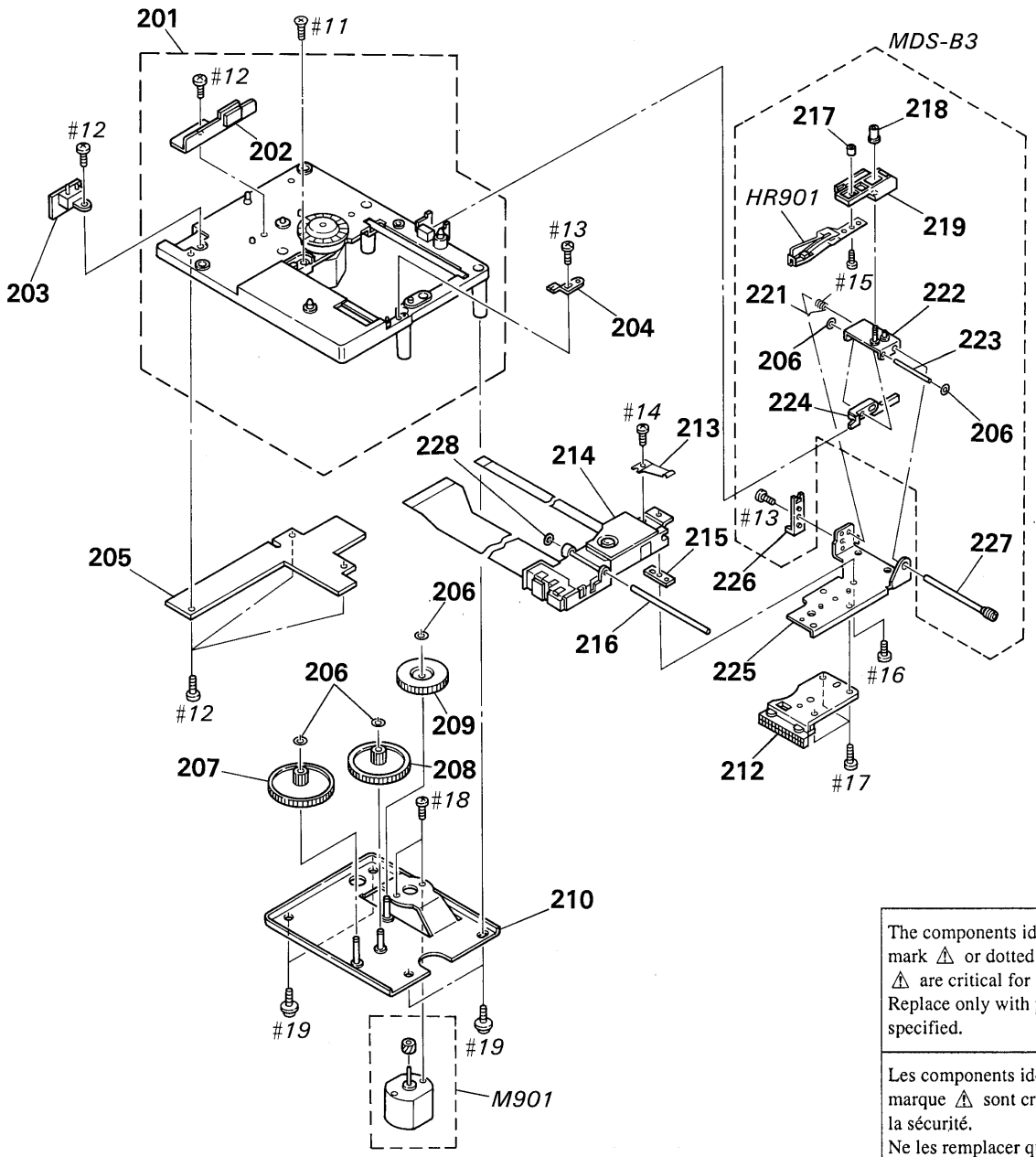
Ref. No.	Part No.	Description	Remark
* 101	X-4944-996-1	BRACKET (GUIDE L) ASSY	
103	4-957-800-11	DAMPER (MD)	
104	X-4943-553-1	RACK (PLATE CAM L) ASSY	
* 105	4-957-799-01	BLOCK (SW)	
* 106	1-647-652-11	IN/OUT SW BOARD	
108	4-957-801-01	GEAR (CAM GEAR)	
109	4-957-805-01	GEAR (S)	
110	4-957-804-01	GEAR (2)	
111	4-957-795-01	GEAR (DRIVING)	
112	4-957-794-01	PULLEY (GEAR 1)	
113	4-957-797-01	BELT (LOADING)	
114	3-558-708-21	WASHER, STOPPER	
115	3-558-708-01	WASHER, STOPPER	
* 116	1-647-653-11	INTERRUPTER BOARD	
117	4-957-816-01	LEVER (REC LEVER) (MDS-B3)	
118	4-957-815-01	SHAFT (REC LEVER) (MDS-B3)	
* 119	4-957-814-01	BRACKET (REC LEVER) (MDS-B3)	
* 120	A-4649-454-A	H DRIVE BOARD, COMPLETE (MDS-B3)	
* 120	A-4649-960-A	H DRIVE BOARD, COMPLETE (MDS-B4P)	
121	1-751-068-11	WIRE (FLAT TYPE) (24 CORE)	
* 122	1-647-654-11	LOADING MOTOR BOARD	
123	A-4660-372-A	SHAFT (JOINT) ASSY	
* 124	A-4649-658-A	SERVO DRIVE BOARD, COMPLETE	
* 125	X-4943-552-1	BRACKET (BU) ASSY	
126	X-4943-551-1	RACK (PLATE CAM R) ASSY	
* 127	X-4944-997-1	BRACKET (GUIDE R) ASSY	
* 128	A-4649-450-A	RF BOARD, COMPLETE	
129	4-957-798-01	WASHER, STOPPER	
M401	A-4660-373-A	MOTOR ASSY (LOADING)	

8-4. MECHANISM DECK SECTION (SLIDER ASSY)
(MDS-B3 : MDM-1D
MDS-B4P : MDM-1E)



Ref. No.	Part No.	Description	Remark
* 151	X-4943-549-1	SLIDER ASSY	
152	3-558-708-21	WASHER, STOPPER	
153	4-957-798-01	WASHER, STOPPER	
154	4-957-810-01	SPRING, TORSION	
155	4-957-802-01	LEVER (DETECTION)	
* 156	X-4943-550-1	SLIDER (EJECT) ASSY	
157	4-957-809-01	SPRING (EJECT LEVER), TORSION	
158	4-957-803-01	LEVER (EJECT)	
159	4-957-811-01	SPRING (EJ SLIDER), TORSION	
160	4-957-808-01	SPRING, COMPRESSION	
161	4-957-812-01	SPRING (SHUTTER LEVER), TORSION	
162	X-4944-745-1	REPAIR KIT	
* 163	X-4943-548-1	HOLDER ASSY	

8-5. BASE UNIT SECTION
(MDS-B3 : MBU-1A
MDS-B4P : MBU-1B)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les components identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
201	A-4660-222-A	CHASSIS (BU) COMPLETE ASSY BOARD, COMPLE	
202	A-4660-364-A	BRACKET (MAGNET) ASSY	
* 203	1-647-648-11	DETECTION SWITCH BOARD	
204	4-957-047-01	HOLDER (SHAFT)	
* 205	1-647-647-11	BU RELAY BOARD	
206	3-681-678-00	WASHER, SLIT	
207	4-957-057-01	GEAR (PINION A)	
208	4-957-058-01	GEAR (PINION B)	
209	4-957-059-01	GEAR (PINION C)	
* 210	X-4943-431-1	BRACKET (PINION) ASSY	
212	X-4943-432-1	RACK ASSY	
213	4-957-056-01	DETENT (OPTICS BLOCK)	
⚠214	8-583-005-11	DEVICE, MINIATURE DISK KMS-140C	
215	4-957-048-01	SPACER	

Ref. No.	Part No.	Description	Remark
216	4-957-044-01	SHAFT (SLED A)	
217	4-957-053-01	NUT (M1.7), FITTING (MDS-B3)	
218	4-957-658-01	NUT (M2), FASTENING (MDS-B3)	
* 219	4-957-054-01	HOLDER (OWH) (MDS-B3)	
221	4-957-049-01	SPRING (HOLDER), TORSION (MDS-B3)	
* 222	X-4943-433-1	BRACKET (HOLDER) ASSY (MDS-B3)	
223	4-957-051-01	SHAFT (SLED D) (MDS-B3)	
* 224	4-957-061-01	LEVER (OWH) (MDS-B3)	
* 225	4-957-052-01	BRACKET (RACK)	
* 226	4-957-055-01	HOLDER (WIRE) (MDS-B3)	
227	X-4943-434-1	SCREW ASSY, ADJUSTMENT (MDS-B3)	
228	4-958-741-01	SPACER	
HR901	1-500-006-11	HEAD, OVER LIGHT (MDS-B3)	
M901	X-4944-046-1	MOTOR ASSY (SLED)	

SECTION 9
ELECTRICAL PARTS LIST

AC **ADDA**

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- –XX and –X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example:
  uA··· : μA···, uPA··· : μPA···, uPB··· : μPB···, uPC··· : μPC···, uPD··· : μPD···
- CAPACITORS
  uF : μF
- COILS
  uH : μH

When indicating parts by reference number, please include the board.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les components identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			Remark
*	1-649-494-11	AC BOARD			
		********			
	1-555-724-00	WIRE, GROUND			
		< CAPACITOR >			
⚠C1	1-161-744-51	CERAMIC	0.01uF		400V
⚠C2	1-161-744-51	CERAMIC	0.01uF		400V
		< CONNECTOR >			
* CN1	1-580-940-11	PIN, CONNECTOR 4P			
		< JACK >			
⚠CNJ1	1-580-375-11	INLET 3P (~AC IN)			
		< SWITCH >			
⚠S1	1-570-117-21	SWITCH, SEESAW (AC POWER) (POWER)			
**********					
*	A-4673-147-A	ADDA BOARD, COMPLETE (MDS-B3)			
*	A-4673-155-A	ADDA BOARD, COMPLETE (MDS-B4P)			
		**********			
*	4-870-539-00	PLATE, GROUND			
		< CAPACITOR >			
C501	1-124-477-11	ELECT	47uF	20%	25V
C502	1-124-477-11	ELECT	47uF	20%	25V
C503	1-110-335-11	MYLAR	100PF	5%	50V
C504	1-110-335-11	MYLAR	100PF	5%	50V
C505	1-136-165-00	FILM	0.1uF	5%	50V
C509	1-136-153-00	FILM	0.01uF	5%	50V
C510	1-164-159-11	CERAMIC	0.1uF		50V
C511	1-110-335-11	MYLAR	100PF	5%	50V
C512	1-110-335-11	MYLAR	100PF	5%	50V
C550	1-107-037-00	MICA	82PF	5%	500V
C551	1-107-287-91	MICA	30PF	5%	500V
C552	1-107-287-91	MICA	30PF	5%	500V
C553	1-130-475-00	MYLAR	0.0022uF	5%	50V
C554	1-130-479-00	MYLAR	0.0047uF	5%	50V
C555	1-130-472-00	MYLAR	0.0012uF	5%	50V
C556	1-124-477-11	ELECT	47uF	20%	25V
C557	1-123-819-21	ELECT	33uF	20%	25V
C559	1-136-165-00	FILM	0.1uF	5%	50V
C561	1-124-477-11	ELECT	47uF	20%	25V
C594	1-124-478-11	ELECT	100uF	20%	25V
C595	1-124-478-11	ELECT	100uF	20%	25V
C601	1-124-477-11	ELECT	47uF	20%	25V
C602	1-124-477-11	ELECT	47uF	20%	25V
C603	1-110-335-11	MYLAR	100PF	5%	50V
C604	1-110-335-11	MYLAR	100PF	5%	50V
C605	1-136-165-00	FILM	0.1uF	5%	50V
C606	1-124-477-11	ELECT	47uF	20%	25V
C607	1-136-165-00	FILM	0.1uF	5%	50V
C609	1-136-153-00	FILM	0.01uF	5%	50V
C610	1-164-159-11	CERAMIC	0.1uF		50V
C611	1-110-335-11	MYLAR	100PF	5%	50V
C612	1-110-335-11	MYLAR	100PF	5%	50V
C650	1-107-037-00	MICA	82PF	5%	500V
C651	1-107-287-91	MICA	30PF	5%	500V
C652	1-107-287-91	MICA	30PF	5%	500V
C653	1-130-475-00	MYLAR	0.0022uF	5%	50V
C654	1-130-479-00	MYLAR	0.0047uF	5%	50V
C655	1-130-472-00	MYLAR	0.0012uF	5%	50V
C656	1-124-477-11	ELECT	47uF	20%	25V
C657	1-123-819-21	ELECT	33uF	20%	25V
C659	1-136-165-00	FILM	0.1uF	5%	50V
C661	1-124-477-11	ELECT	47uF	20%	25V
C694	1-124-478-11	ELECT	100uF	20%	25V
C695	1-124-478-11	ELECT	100uF	20%	25V
C703	1-124-477-11	ELECT	47uF	20%	25V
C704	1-124-477-11	ELECT	47uF	20%	25V
C705	1-124-477-11	ELECT	47uF	20%	25V
C706	1-164-159-11	CERAMIC	0.1uF		50V
C707	1-164-159-11	CERAMIC	0.1uF		50V
C710	1-136-165-00	FILM	0.1uF	5%	50V
C711	1-136-165-00	FILM	0.1uF	5%	50V
C712	1-136-165-00	FILM	0.1uF	5%	50V
C713	1-136-177-00	FILM	1uF	5%	50V

ADDA

Ref. No.	Part No.	Description			Remark
C714	1-136-158-00	FILM	0.027uF	5%	50V
C715	1-162-282-31	CERAMIC	100PF	10%	50V
C716	1-162-290-31	CERAMIC	470PF	10%	50V
C730	1-124-477-11	ELECT	47uF	20%	25V
C734	1-164-159-11	CERAMIC	0.1uF		50V
C735	1-164-159-11	CERAMIC	0.1uF		50V
C736	1-164-159-11	CERAMIC	0.1uF		50V
C739	1-124-477-11	ELECT	47uF	20%	25V
C740	1-124-477-11	ELECT	47uF	20%	25V
C741	1-126-103-11	ELECT	470uF	20%	16V
C742	1-126-103-11	ELECT	470uF	20%	16V
C743	1-136-165-00	FILM	0.1uF	5%	50V
C750	1-164-159-11	CERAMIC	0.1uF		50V
C751	1-164-159-11	CERAMIC	0.1uF		50V
C752	1-164-159-11	CERAMIC	0.1uF		50V
C753	1-164-159-11	CERAMIC	0.1uF		50V
C754	1-164-159-11	CERAMIC	0.1uF		50V
C755	1-124-477-11	ELECT	47uF	20%	25V
C756	1-124-477-11	ELECT	47uF	20%	25V
C757	1-124-477-11	ELECT	47uF	20%	25V
C758	1-124-477-11	ELECT	47uF	20%	25V
C759	1-126-916-11	ELECT	1000uF	20%	6.3V
		< CONNECTOR >			
CN501	1-691-994-11	PIN, CONNECTOR (PC BOARD) 5P			
CN601	1-691-994-31	PIN, CONNECTOR (PC BOARD) 5P			
CN701	1-580-463-21	SOCKET, CONNECTOR 16P			
CN702	1-695-088-11	PIN, CONNECTOR (PC BOARD) 9P			
* CN704	1-564-336-00	PIN, CONNECTOR 2P			
		< DIODE >			
D501	8-719-987-63	DIODE	1N4148M		
D502	8-719-987-63	DIODE	1N4148M		
D503	8-719-987-63	DIODE	1N4148M		
D504	8-719-987-63	DIODE	1N4148M		
D601	8-719-987-63	DIODE	1N4148M		
D602	8-719-987-63	DIODE	1N4148M		
D603	8-719-987-63	DIODE	1N4148M		
D604	8-719-987-63	DIODE	1N4148M		
D701	8-719-987-63	DIODE	1N4148M		
D702	8-719-045-72	DIODE	KV1550NT		
D703	8-719-987-63	DIODE	1N4148M		
D704	8-719-987-63	DIODE	1N4148M		
D705	8-719-987-63	DIODE	1N4148M		
D706	8-719-987-63	DIODE	1N4148M		
		< ENCAPSULATED COMPONENT >			
FB701	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB702	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		

Ref. No.	Part No.	Description			Remark
		< IC >			
IC701	8-759-045-15	IC	CS5339-KS (MDS-B3)		
IC702	8-752-359-50	IC	CXD2564AM		
IC703	8-759-233-64	IC	TC74HCU04AF		
IC704	8-759-926-95	IC	SN74HC4020ANS		
IC705	8-759-250-81	IC	TC5081AP		
IC707	8-759-708-05	IC	NJM78L05A		
IC708	8-759-700-65	IC	NJM79L05A		
IC710	8-759-634-51	IC	M5218AP		
IC711	8-759-634-51	IC	M5218AP		
IC712	8-759-634-51	IC	M5218AP		
IC715	8-759-634-51	IC	M5218AP (MDS-B3)		
IC716	8-759-109-82	IC	uPC814C (MDS-B3)		
IC717	8-759-636-55	IC	M5218AFP		
		< COIL >			
L701	1-410-517-11	INDUCTOR	47uH		
L702	1-410-517-11	INDUCTOR	47uH		
L703	1-410-517-11	INDUCTOR	47uH		
L704	1-410-517-11	INDUCTOR	47uH		
L705	1-410-517-11	INDUCTOR	47uH		
L706	1-410-517-11	INDUCTOR	47uH		
L707	1-410-517-11	INDUCTOR	47uH		
L712	1-424-604-11	COIL			
		< TRANSISTOR >			
Q550	8-729-141-30	TRANSISTOR	2SC3623A-LK		
Q650	8-729-141-30	TRANSISTOR	2SC3623A-LK		
Q701	8-729-900-80	TRANSISTOR	DTC114ES		
Q702	8-729-806-04	TRANSISTOR	2SA1503		
Q703	8-729-806-04	TRANSISTOR	2SA1503		
Q704	8-729-806-04	TRANSISTOR	2SA1503		
		< RESISTOR >			
R501	1-215-453-00	METAL	22K	1%	1/6W
R502	1-215-453-00	METAL	22K	1%	1/6W
R503	1-215-439-00	METAL	5.6K	1%	1/6W
R504	1-215-439-00	METAL	5.6K	1%	1/6W
R505	1-249-413-11	CARBON	470	5%	1/4W
R506	1-249-417-11	CARBON	1K	5%	1/4W
R507	1-249-417-11	CARBON	1K	5%	1/4W
R508	1-249-429-11	CARBON	10K	5%	1/4W
R509	1-249-419-11	CARBON	1.5K	5%	1/4W
R510	1-215-457-00	METAL	33K	1%	1/6W
R511	1-215-493-00	METAL	1M	1%	1/6W
R513	1-249-403-11	CARBON	68	5%	1/4W
R514	1-249-397-11	CARBON	22	5%	1/4W
R515	1-215-421-00	METAL	1K	1%	1/6W

Ref. No.	Part No.	Description			Remark
R516	1-215-385-00	METAL	33	1%	1/6W
R550	1-215-457-00	METAL	33K	1%	1/6W
R551	1-215-457-00	METAL	33K	1%	1/6W
R552	1-215-451-00	METAL	18K	1%	1/6W
R553	1-215-451-00	METAL	18K	1%	1/6W
R554	1-215-465-00	METAL	68K	1%	1/6W
R555	1-215-465-00	METAL	68K	1%	1/6W
R556	1-249-441-11	CARBON	100K	5%	1/4W
R557	1-247-807-31	CARBON	100	5%	1/4W
R558	1-249-419-11	CARBON	1.5K	5%	1/4W
R559	1-249-419-11	CARBON	1.5K	5%	1/4W
R560	1-249-441-11	CARBON	100K	5%	1/4W
R562	1-249-417-11	CARBON	1K	5%	1/4W
R563	1-249-413-11	CARBON	470	5%	1/4W
R564	1-249-417-11	CARBON	1K	5%	1/4W
R565	1-249-441-11	CARBON	100K	5%	1/4W
R580	1-249-429-11	CARBON	10K	5%	1/4W
R581	1-249-429-11	CARBON	10K	5%	1/4W
R582	1-249-429-11	CARBON	10K	5%	1/4W
R583	1-249-413-11	CARBON	470	5%	1/4W
R592	1-249-441-11	CARBON	100K	5%	1/4W
R593	1-249-441-11	CARBON	100K	5%	1/4W
R601	1-215-453-00	METAL	22K	1%	1/6W
R602	1-215-453-00	METAL	22K	1%	1/6W
R603	1-215-439-00	METAL	5.6K	1%	1/6W
R604	1-215-439-00	METAL	5.6K	1%	1/6W
R605	1-249-413-11	CARBON	470	5%	1/4W
R606	1-249-417-11	CARBON	1K	5%	1/4W
R607	1-249-417-11	CARBON	1K	5%	1/4W
R608	1-249-429-11	CARBON	10K	5%	1/4W
R609	1-249-419-11	CARBON	1.5K	5%	1/4W
R610	1-215-457-00	METAL	33K	1%	1/6W
R611	1-215-493-00	METAL	1M	1%	1/6W
R612	1-249-417-11	CARBON	1K	5%	1/4W
R613	1-249-403-11	CARBON	68	5%	1/4W
R614	1-249-397-11	CARBON	22	5%	1/4W
R615	1-215-421-00	METAL	1K	1%	1/6W
R616	1-215-385-00	METAL	33	1%	1/6W
R650	1-215-457-00	METAL	33K	1%	1/6W
R651	1-215-457-00	METAL	33K	1%	1/6W
R652	1-215-451-00	METAL	18K	1%	1/6W
R653	1-215-451-00	METAL	18K	1%	1/6W
R654	1-215-465-00	METAL	68K	1%	1/6W
R655	1-215-465-00	METAL	68K	1%	1/6W
R656	1-249-441-11	CARBON	100K	5%	1/4W
R657	1-247-807-31	CARBON	100	5%	1/4W
R658	1-249-419-11	CARBON	1.5K	5%	1/4W
R659	1-249-419-11	CARBON	1.5K	5%	1/4W

Ref. No.	Part No.	Description			Remark
R660	1-249-441-11	CARBON	100K	5%	1/4W
R662	1-249-417-11	CARBON	1K	5%	1/4W
R663	1-249-413-11	CARBON	470	5%	1/4W
R664	1-249-417-11	CARBON	1K	5%	1/4W
R665	1-249-441-11	CARBON	100K	5%	1/4W
R680	1-249-429-11	CARBON	10K	5%	1/4W
R681	1-249-429-11	CARBON	10K	5%	1/4W
R682	1-249-429-11	CARBON	10K	5%	1/4W
R683	1-249-413-11	CARBON	470	5%	1/4W
R692	1-249-441-11	CARBON	100K	5%	1/4W
R693	1-249-441-11	CARBON	100K	5%	1/4W
R702	1-249-429-11	CARBON	10K	5%	1/4W
R704	1-247-807-31	CARBON	100	5%	1/4W
R706	1-247-903-00	CARBON	1M	5%	1/4W
R707	1-249-417-11	CARBON	1K	5%	1/4W
R708	1-249-434-11	CARBON	27K	5%	1/4W
R709	1-249-431-11	CARBON	15K	5%	1/4W
R710	1-249-435-11	CARBON	33K	5%	1/4W
R711	1-249-417-11	CARBON	1K	5%	1/4W
R712	1-249-417-11	CARBON	1K	5%	1/4W
R713	1-249-429-11	CARBON	10K	5%	1/4W
R714	1-247-807-31	CARBON	100	5%	1/4W
R715	1-247-903-00	CARBON	1M	5%	1/4W
R716	1-249-417-11	CARBON	1K	5%	1/4W
R717	1-247-807-31	CARBON	100	5%	1/4W
R718	1-247-807-31	CARBON	100	5%	1/4W

< VARIABLE RESISTOR >

RV501	1-230-721-11	RES, ADJ, CARBON 10K (RECORD CH-1 L) (MDS-B3)
RV551	1-230-721-11	RES, ADJ, CARBON 10K (PLAY BACK CH-1 L)
RV601	1-230-721-11	RES, ADJ, CARBON 10K (RECORD CH-2 R) (MDS-B3)
RV651	1-230-721-11	RES, ADJ, CARBON 10K (PLAY BACK CH-2 R)

< RELAY >

RY701	1-515-716-11	RELAY (TQ2-5V)

< SWITCH >

S701	1-692-457-11	SWITCH, SLIDE (MODE)

****

* 1-647-647-11 BU RELAY BOARD

****

< CONNECTOR >

CN200	1-750-501-11	PIN, CONNECTOR (PC BOARD) 8P

BU RELAY **BUF** **CN**

Ref. No.	Part No.	Description			Remark
		< SWITCH >			
S901	1-572-467-21	SWITCH, PUSH (1 KEY) (LIMIT)			
**********					
*	1-649-502-11	BUF BOARD			
		*********			
		< CAPACITOR >			
C563	1-136-165-00	FILM	0.1uF	5%	50V
C663	1-136-165-00	FILM	0.1uF	5%	50V
		< CONNECTOR >			
CN703	1-695-093-11	SOCKET, CONNECTOR 9P			
		< IC >			
IC713	8-759-900-72	IC NE5532P			
IC714	8-759-900-72	IC NE5532P			
		< RESISTOR >			
R568	1-215-421-00	METAL	1K	1%	1/6W
R570	1-249-417-11	CARBON	1K	5%	1/4W
R571	1-215-421-00	METAL	1K	1%	1/6W
R573	1-215-440-00	METAL	6.2K	1%	1/6W
R574	1-215-421-00	METAL	1K	1%	1/6W
R575	1-215-440-00	METAL	6.2K	1%	1/6W
R576	1-247-807-31	CARBON	100	5%	1/4W
R577	1-247-807-31	CARBON	100	5%	1/4W
R668	1-215-421-00	METAL	1K	1%	1/6W
R670	1-249-417-11	CARBON	1K	5%	1/4W
R671	1-215-421-00	METAL	1K	1%	1/6W
R673	1-215-440-00	METAL	6.2K	1%	1/6W
R674	1-215-421-00	METAL	1K	1%	1/6W
R675	1-215-440-00	METAL	6.2K	1%	1/6W
R676	1-247-807-31	CARBON	100	5%	1/4W
R677	1-247-807-31	CARBON	100	5%	1/4W
**********					
*	A-4673-105-A	CN BOARD, COMPLETE			
		**********			
*	4-870-539-00	PLATE, GROUND			
		< CAPACITOR >			
C801	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C802	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C803	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C804	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C805	1-165-319-11	CERAMIC CHIP	0.1uF		50V

Ref. No.	Part No.	Description			Remark
C806	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C807	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C808	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C809	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C810	1-124-779-00	ELECT CHIP	10uF	20%	16V
C811	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C812	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C813	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C814	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C815	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C816	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C817	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C818	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C819	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C820	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C821	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C822	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C823	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C824	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C825	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C826	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C827	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C828	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C829	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C830	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C831	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C832	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C833	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C834	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C835	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C836	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C837	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C839	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C880	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C881	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C882	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C883	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C884	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C885	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C886	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C887	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C893	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C894	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C895	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C934	1-126-917-11	ELECT	3300uF	20%	6.3V
		< CONNECTOR >			
* CN801	1-750-511-21	CONNECTOR, FFC/FPC 24P			
* CN802	1-750-511-21	CONNECTOR, FFC/FPC 24P			

Ref. No.	Part No.	Description	Remark
CN803	1-750-279-11	CONNECTOR, FFC/FPC 24P	
CN804	1-750-279-11	CONNECTOR, FFC/FPC 24P	
CN805	1-580-464-21	SOCKET, CONNECTOR 15P	
CN806	1-580-464-21	SOCKET, CONNECTOR 15P	
CN807	1-580-460-11	SOCKET, CONNECTOR 26P	
* CN808	1-750-494-31	PIN, CONNECTOR (PC BOARD) 6P	
* CN809	1-750-495-11	PIN, CONNECTOR (PC BOARD) 7P	
CN810	1-695-001-11	PIN, CONNECTOR (PC BOARD) 12P	
CN880	1-750-493-31	PIN, CONNECTOR (PC BOARD) 5P	
CN881	1-691-995-11	PIN, CONNECTOR (PC BOARD) 6P	
		< DIODE >	
D801	8-719-800-76	DIODE 1SS226	
D802	8-719-800-76	DIODE 1SS226	
D803	8-719-800-76	DIODE 1SS226	
D804	8-719-800-76	DIODE 1SS226	
D805	8-719-800-76	DIODE 1SS226	
D806	8-719-800-76	DIODE 1SS226	
D807	8-719-800-76	DIODE 1SS226	
D808	8-719-800-76	DIODE 1SS226	
D809	8-719-800-76	DIODE 1SS226	
D810	8-719-800-76	DIODE 1SS226	
D811	8-719-800-76	DIODE 1SS226	
D812	8-719-800-76	DIODE 1SS226	
D813	8-719-800-76	DIODE 1SS226	
D814	8-719-800-76	DIODE 1SS226	
D815	8-719-800-76	DIODE 1SS226	
D816	8-719-992-02	DIODE RB705D	
D817	8-719-992-02	DIODE RB705D	
D880	8-719-800-76	DIODE 1SS226	
D881	8-719-800-76	DIODE 1SS226	
		< IC >	
IC801	8-759-925-76	IC SN74HC08ANS	
IC802	8-759-925-76	IC SN74HC08ANS	
IC803	8-759-925-76	IC SN74HC08ANS	
IC804	8-759-233-64	IC TC74HCU04AF	
IC880	8-759-077-32	IC SN75ALS181N	
IC881	8-759-242-74	IC TC7W04F	
		< JUMPER RESISTOR >	
JW801	1-216-295-00	METAL CHIP 0 5% 1/10W	
JW802	1-216-295-00	METAL CHIP 0 5% 1/10W	
JW803	1-216-295-00	METAL CHIP 0 5% 1/10W	
JW804	1-216-295-00	METAL CHIP 0 5% 1/10W	
JW805	1-216-295-00	METAL CHIP 0 5% 1/10W	

Ref. No.	Part No.	Description	Remark
		< TRANSISTOR >	
Q801	8-729-805-64	TRANSISTOR 2SA1510	
Q802	8-729-805-64	TRANSISTOR 2SA1510	
Q803	8-729-805-64	TRANSISTOR 2SA1510	
Q804	8-729-805-64	TRANSISTOR 2SA1510	
Q805	8-729-805-64	TRANSISTOR 2SA1510	
Q806	8-729-805-64	TRANSISTOR 2SA1510	
Q807	8-729-805-64	TRANSISTOR 2SA1510	
Q808	8-729-805-64	TRANSISTOR 2SA1510	
Q809	8-729-805-64	TRANSISTOR 2SA1510	
Q810	8-729-805-64	TRANSISTOR 2SA1510	
Q811	8-729-805-64	TRANSISTOR 2SA1510	
Q812	8-729-805-64	TRANSISTOR 2SA1510	
Q820	8-729-600-22	TRANSISTOR 2SA1235-F	
		< RESISTOR >	
R801	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R802	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R803	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R804	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R805	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R806	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R807	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R808	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R809	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R810	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R811	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R812	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R813	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R814	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R815	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R816	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R817	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R818	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R819	1-216-025-00	METAL CHIP 100 5% 1/10W	
R820	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R821	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R822	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R823	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R824	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R825	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R826	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R827	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R828	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R829	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R830	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R831	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R880	1-216-025-00	METAL CHIP 100 5% 1/10W	

CN D-SUB DETECTION SWITCH DIG

Ref. No.	Part No.	Description			Remark
R881	1-216-025-00	METAL CHIP	100	5%	1/10W
R882	1-216-026-00	METAL CHIP	110	5%	1/10W
R883	1-216-001-00	METAL CHIP	10	5%	1/10W
R884	1-216-001-00	METAL CHIP	10	5%	1/10W
R885	1-216-025-00	METAL CHIP	100	5%	1/10W
R886	1-216-049-00	METAL CHIP	1K	5%	1/10W

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* 1-649-493-11 D-SUB BOARD

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< CAPACITOR >

C851	1-164-159-11	CERAMIC	0.1uF		50V
C854	1-162-294-31	CERAMIC	0.001uF	10%	50V
C855	1-162-294-31	CERAMIC	0.001uF	10%	50V
C856	1-162-294-31	CERAMIC	0.001uF	10%	50V
C857	1-162-294-31	CERAMIC	0.001uF	10%	50V
C858	1-162-294-31	CERAMIC	0.001uF	10%	50V
C860	1-162-294-31	CERAMIC	0.001uF	10%	50V
C861	1-162-294-31	CERAMIC	0.001uF	10%	50V
C862	1-162-294-31	CERAMIC	0.001uF	10%	50V
C863	1-162-294-31	CERAMIC	0.001uF	10%	50V
C864	1-162-294-31	CERAMIC	0.001uF	10%	50V
C865	1-162-294-31	CERAMIC	0.001uF	10%	50V
C866	1-162-294-31	CERAMIC	0.001uF	10%	50V
C867	1-162-294-31	CERAMIC	0.001uF	10%	50V
C868	1-162-294-31	CERAMIC	0.001uF	10%	50V
C869	1-162-294-31	CERAMIC	0.001uF	10%	50V
C870	1-162-294-31	CERAMIC	0.001uF	10%	50V
C871	1-162-294-31	CERAMIC	0.001uF	10%	50V
C872	1-162-294-31	CERAMIC	0.001uF	10%	50V
C873	1-162-294-31	CERAMIC	0.001uF	10%	50V
C874	1-162-294-31	CERAMIC	0.001uF	10%	50V

< CONNECTOR >

CN851	1-580-460-11	SOCKET, CONNECTOR 26P

< JACK >

J851	1-764-392-11	CONNECTOR (D-SUB) 25P (REMOTE 25P)

< TRANSISTOR >

Q851	8-729-927-03	TRANSISTOR	2SC4115SS
Q852	8-729-927-03	TRANSISTOR	2SC4115SS
Q853	8-729-927-03	TRANSISTOR	2SC4115SS
Q854	8-729-927-03	TRANSISTOR	2SC4115SS
Q855	8-729-927-03	TRANSISTOR	2SC4115SS
Q856	8-729-927-03	TRANSISTOR	2SC4115SS
Q857	8-729-927-03	TRANSISTOR	2SC4115SS
Q858	8-729-927-03	TRANSISTOR	2SC4115SS

< RESISTOR >

R851	1-249-417-11	CARBON	1K	5%	1/4W
R852	1-249-417-11	CARBON	1K	5%	1/4W
R853	1-249-417-11	CARBON	1K	5%	1/4W
R854	1-249-417-11	CARBON	1K	5%	1/4W
R855	1-249-417-11	CARBON	1K	5%	1/4W
R856	1-249-417-11	CARBON	1K	5%	1/4W
R857	1-249-417-11	CARBON	1K	5%	1/4W
R858	1-249-417-11	CARBON	1K	5%	1/4W
R863	1-249-389-11	CARBON	4.7	5%	1/4W

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* 1-647-648-11 DETECTION SWITCH BOARD

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< SWITCH >

S001	1-692-464-11	SWITCH, PUSH (2 KEY) (RFLCT/PROT)

****

* A-4673-103-A DIG BOARD, COMPLETE

****

< CAPACITOR >

C100	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C101	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C102	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C103	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C104	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C105	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C106	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C107	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C108	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C109	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C110	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C111	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C112	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C113	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C114	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C115	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C116	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C117	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C118	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C119	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C120	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C121	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C122	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C123	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V

Ref. No.	Part No.	Description			Remark
C124	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C125	1-104-563-11	FILM CHIP	0.1uF	5%	16V
C126	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C128	1-163-091-00	CERAMIC CHIP	8PF		50V
C129	1-163-091-00	CERAMIC CHIP	8PF		50V
C130	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C131	1-104-640-11	FILM CHIP	0.22uF	5%	16V
C132	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C133	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C134	1-137-299-11	FILM CHIP	0.027uF	5%	16V
C135	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C136	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C137	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C138	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C139	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C140	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C141	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C142	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C143	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C144	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C145	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C146	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C147	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C148	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C149	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C150	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C151	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C153	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C154	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C158	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C159	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C160	1-104-551-11	FILM CHIP	0.01uF	5%	16V
C161	1-163-003-11	CERAMIC CHIP	330PF	10%	50V
C162	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C163	1-126-395-11	ELECT	22uF	20%	16V
C164	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C165	1-126-395-11	ELECT	22uF	20%	16V
C166	1-126-395-11	ELECT	22uF	20%	16V
C167	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C168	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C169	1-104-559-11	FILM CHIP	0.047uF	5%	16V
C170	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C185	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C187	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C191	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C192	1-163-003-11	CERAMIC CHIP	330PF	10%	50V
C193	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C194	1-163-117-00	CERAMIC CHIP	100PF	5%	50V

Ref. No.	Part No.	Description			Remark
C201	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C202	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C301	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C303	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C305	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C306	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C307	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C308	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C951	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C952	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
		< CONNECTOR >			
CN105	1-580-870-31	SOCKET, CONNECTOR (SMT) 16P			
CN106	1-750-493-31	PIN, CONNECTOR (PC BOARD) 5P			
* CNP101	1-750-511-21	CONNECTOR, FFC/FPC 24P			
* CNP102	1-750-511-21	CONNECTOR, FFC/FPC 24P			
* CNP103	1-750-495-11	PIN, CONNECTOR (PC BOARD) 7P			
* CNP104	1-750-492-31	PIN, CONNECTOR (PC BOARD) 4P			
* CNP108	1-750-494-31	PIN, CONNECTOR (PC BOARD) 6P			
		< DIODE >			
D102	8-719-974-98	DIODE	HVM17-01		
D103	8-719-016-74	DIODE	1SS352		
D104	8-719-016-74	DIODE	1SS352		
		< IC >			
IC101	8-752-355-96	IC	CXD2527R		
IC102	8-752-356-18	IC	CXD2527R-1		
IC103	8-752-352-18	IC	CXD2525R		
IC104	8-759-242-70	IC	TC7WU04F		
IC106	8-759-970-59	IC	TLC272CPS		
IC109	8-752-354-52	IC	CXK414400TM-12		
IC110	8-752-354-57	IC	CXD2526Q		
IC111	8-759-186-81	IC	M38067E8-FP-B3-1		
IC161	8-752-064-33	IC	CXA1380N		
IC191	8-759-083-94	IC	TC7W74FU		
IC192	8-759-234-13	IC	TC4S30F		
		< JUMPER RESISTOR >			
JW102	1-216-295-00	METAL CHIP	0	5%	1/10W
JW201	1-216-295-00	METAL CHIP	0	5%	1/10W
JW202	1-216-295-00	METAL CHIP	0	5%	1/10W
JW203	1-216-295-00	METAL CHIP	0	5%	1/10W
		< COIL >			
L101	1-412-333-41	INDUCTOR	2.7uH		
L102	1-412-332-41	INDUCTOR	2.2uH		
L103	1-412-332-41	INDUCTOR	2.2uH		

DIG

Ref. No.	Part No.	Description				Remark
L104	1-412-340-31	INDUCTOR	10uH			
L105	1-412-344-31	INDUCTOR	22uH			
L106	1-412-340-31	INDUCTOR	10uH			
L107	1-412-340-31	INDUCTOR	10uH			
L108	1-412-336-41	INDUCTOR	4.7uH			
L109	1-412-332-41	INDUCTOR	2.2uH			
L150	1-543-962-21	BEAD, FERRITE (CHIP)				
L151	1-550-907-21	BEAD, FERRITE (CHIP)				
L152	1-543-962-21	BEAD, FERRITE (CHIP)				
L951	1-412-332-41	INDUCTOR	2.2uH			
L952	1-543-962-21	BEAD, FERRITE (CHIP)				
L953	1-543-962-21	BEAD, FERRITE (CHIP)				
L954	1-543-962-21	BEAD, FERRITE (CHIP)				
L955	1-543-962-21	BEAD, FERRITE (CHIP)				
L956	1-543-962-21	BEAD, FERRITE (CHIP)				
		< TRANSISTOR >				
Q101	8-729-421-19	TRANSISTOR	UN2213			
Q102	8-729-901-06	TRANSISTOR	DTA144EK			
		< RESISTOR >				
R100	1-216-025-00	METAL CHIP	100	5%	1/10W	
R101	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R102	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R103	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R104	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R107	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R108	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R109	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R110	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R111	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R112	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R113	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R117	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R118	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R119	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R120	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R121	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R122	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R123	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R124	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R125	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R126	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R127	1-216-043-00	METAL CHIP	560	5%	1/10W	
R128	1-216-043-00	METAL CHIP	560	5%	1/10W	
R129	1-216-043-00	METAL CHIP	560	5%	1/10W	
R130	1-216-073-00	METAL CHIP	10K	5%	1/10W	

Ref. No.	Part No.	Description				Remark
R131	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R132	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R133	1-216-070-00	METAL CHIP	7.5K	5%	1/10W	
R134	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R135	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R136	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R137	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R138	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R139	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R140	1-216-043-00	METAL CHIP	560	5%	1/10W	
R141	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R142	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R144	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R145	1-216-025-00	METAL CHIP	100	5%	1/10W	
R146	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R147	1-216-045-00	METAL CHIP	680	5%	1/10W	
R148	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R149	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R150	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R151	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R152	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R153	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R154	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R155	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R156	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R157	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R158	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R159	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R160	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R161	1-218-758-11	METAL CHIP	180K	0.5%	1/10W	
R162	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R163	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R164	1-218-758-11	METAL CHIP	180K	0.5%	1/10W	
R165	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R166	1-216-112-00	METAL CHIP	430K	5%	1/10W	
R167	1-216-090-00	METAL CHIP	51K	5%	1/10W	
R168	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R169	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R170	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R171	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R172	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R173	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R174	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R175	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R176	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R177	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R178	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R180	1-216-025-00	METAL CHIP	100	5%	1/10W	
R181	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	

Ref. No.	Part No.	Description			Remark
R182	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R183	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R184	1-216-049-00	METAL CHIP	1K	5%	1/10W
R185	1-216-046-00	METAL CHIP	750	5%	1/10W
R186	1-216-049-00	METAL CHIP	1K	5%	1/10W
R187	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R188	1-216-295-00	METAL CHIP	0	5%	1/10W
R193	1-216-073-00	METAL CHIP	10K	5%	1/10W
R194	1-216-073-00	METAL CHIP	10K	5%	1/10W
R195	1-216-073-00	METAL CHIP	10K	5%	1/10W
R196	1-216-073-00	METAL CHIP	10K	5%	1/10W
R197	1-216-073-00	METAL CHIP	10K	5%	1/10W
R198	1-216-073-00	METAL CHIP	10K	5%	1/10W
R201	1-216-295-00	METAL CHIP	0	5%	1/10W
R202	1-216-097-00	METAL CHIP	100K	5%	1/10W
R203	1-216-097-00	METAL CHIP	100K	5%	1/10W
		< VIBRATOR >			
X101	1-579-871-21	VIBRATOR, CRYSTAL (55MHz)			
X102	1-579-870-21	VIBRATOR, CRYSTAL (22.5792MHz)			
X103	1-579-951-11	VIBRATOR, CERAMIC (CHIP TYPE) (6MHz)			
**********					
*	1-652-126-11	DIO BOARD			
		*********			
		< CAPACITOR >			
C888	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C889	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C890	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C891	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C892	1-165-319-11	CERAMIC CHIP	0.1uF		50V
		< CONNECTOR >			
CN882	1-691-995-11	PIN, CONNECTOR (PC BOARD) 6P			
		< ENCAPSULATED COMPONENT >			
FB880	1-239-403-11	FILTER, EMI 180PF			
FB881	1-239-403-11	FILTER, EMI 180PF			
		< JACK >			
J880	1-764-414-11	JACK, PIN (DIGITAL IN) (MDS-B3)			
J881	1-764-413-11	JACK, PIN (DIGITAL OUT)			
		< RESISTOR >			
R888	1-216-013-00	METAL CHIP	33	5%	1/10W
R889	1-216-022-00	METAL CHIP	75	5%	1/10W
R890	1-216-033-00	METAL CHIP	220	5%	1/10W

Ref. No.	Part No.	Description			Remark
R891	1-216-049-00	METAL CHIP	1K	5%	1/10W
		< TRANSFORMER >			
T880	1-437-194-21	TRANSFORMER, PULSE (MDS-B3)			
T881	1-409-594-11	COIL (WITH CORE)			
**********					
*	A-4673-146-A	DISP BOARD, COMPLETE (MDS-B3)			
*	A-4673-157-A	DISP BOARD, COMPLETE (MDS-B4P)			
		**********			
	1-251-154-11	SOCKET, IC (8P)			
	1-540-044-11	SOCKET, IC			
*	4-956-134-01	HOLDER (FL TUBE)			
		< CAPACITOR >			
C301	1-164-159-11	CERAMIC	0.1uF		50V
C302	1-162-282-31	CERAMIC	100PF	10%	50V
C303	1-164-159-11	CERAMIC	0.1uF		50V
C304	1-164-159-11	CERAMIC	0.1uF		50V
C305	1-164-159-11	CERAMIC	0.1uF		50V
C306	1-164-159-11	CERAMIC	0.1uF		50V
C307	1-164-159-11	CERAMIC	0.1uF		50V
C308	1-164-159-11	CERAMIC	0.1uF		50V
C309	1-164-159-11	CERAMIC	0.1uF		50V
C310	1-164-159-11	CERAMIC	0.1uF		50V
C311	1-164-159-11	CERAMIC	0.1uF		50V
C312	1-162-294-31	CERAMIC	0.001uF	10%	50V
C313	1-162-600-11	CERAMIC	0.0047uF	20%	16V
C314	1-124-234-00	ELECT	22uF	20%	16V
C315	1-124-234-00	ELECT	22uF	20%	16V
C316	1-162-282-31	CERAMIC	100PF	10%	50V
C317	1-162-282-31	CERAMIC	100PF	10%	50V
C318	1-162-282-31	CERAMIC	100PF	10%	50V
		< CONNECTOR >			
CN301	1-580-464-11	SOCKET, CONNECTOR 15P			
CN302	1-580-464-11	SOCKET, CONNECTOR 15P			
* CN303	1-506-503-11	PIN, CONNECTOR 9P			
* CN304	1-564-336-00	PIN, CONNECTOR 2P			
* CN305	1-506-503-61	PIN, CONNECTOR 9P			
		< DIODE >			
D301	8-719-987-63	DIODE	1N4148M		
D302	8-719-987-63	DIODE	1N4148M		
D303	8-719-987-63	DIODE	1N4148M		
D304	8-719-987-63	DIODE	1N4148M		
D305	8-719-987-63	DIODE	1N4148M		
D306	8-719-987-63	DIODE	1N4148M		
D307	8-719-987-63	DIODE	1N4148M		

DISP

Ref. No.	Part No.	Description	Remark
D308	8-719-987-63	DIODE 1N4148M	
D309	8-719-987-63	DIODE 1N4148M	
D310	8-719-987-63	DIODE 1N4148M	
D311	8-719-987-63	DIODE 1N4148M	
D312	8-719-987-63	DIODE 1N4148M	
		< FLUORESCENT INDICATOR TUBE >	
FL301	1-517-256-11	INDICATOR TUBE, FLUORESCENT	
		< IC >	
IC301	8-759-289-53	IC M38004E8-SP-B3-2	
IC302	8-759-164-44	IC CXD8459M-T2	
IC303	8-759-925-76	IC SN74HC08ANS	
IC304	8-752-330-61	IC CXK1013P	
IC305	8-759-051-53	IC TD62381F	
IC306	8-759-265-89	IC MSM27C131ZB-04GS-KR1	
IC307	8-759-008-79	IC MC14011BF	
IC308	8-759-051-53	IC TD62381F	
		< TRANSISTOR >	
Q306	8-729-806-04	TRANSISTOR 2SA1503	
Q307	8-729-806-04	TRANSISTOR 2SA1503	
		< RESISTOR >	
R301	1-247-807-31	CARBON 100 5% 1/4W	
R302	1-247-807-31	CARBON 100 5% 1/4W	
R303	1-249-437-11	CARBON 47K 5% 1/4W	
R304	1-249-437-11	CARBON 47K 5% 1/4W	
R305	1-249-437-11	CARBON 47K 5% 1/4W	
R306	1-249-437-11	CARBON 47K 5% 1/4W	
R307	1-249-417-11	CARBON 1K 5% 1/4W	
R308	1-249-437-11	CARBON 47K 5% 1/4W	
R309	1-249-437-11	CARBON 47K 5% 1/4W	
R310	1-249-437-11	CARBON 47K 5% 1/4W	
R311	1-249-437-11	CARBON 47K 5% 1/4W	
R312	1-249-437-11	CARBON 47K 5% 1/4W	
R313	1-249-437-11	CARBON 47K 5% 1/4W	
R315	1-249-434-11	CARBON 27K 5% 1/4W	
R316	1-249-437-11	CARBON 47K 5% 1/4W	
R317	1-249-417-11	CARBON 1K 5% 1/4W	
R318	1-249-417-11	CARBON 1K 5% 1/4W	
R319	1-249-417-11	CARBON 1K 5% 1/4W	
R320	1-249-417-11	CARBON 1K 5% 1/4W	
R321	1-249-417-11	CARBON 1K 5% 1/4W	
R322	1-249-417-11	CARBON 1K 5% 1/4W	
R323	1-249-417-11	CARBON 1K 5% 1/4W	
R324	1-249-417-11	CARBON 1K 5% 1/4W	
R325	1-249-417-11	CARBON 1K 5% 1/4W	

Ref. No.	Part No.	Description	Remark
R326	1-249-417-11	CARBON 1K 5% 1/4W	
R327	1-249-403-11	CARBON 68 5% 1/4W	
R328	1-249-403-11	CARBON 68 5% 1/4W	
R329	1-249-406-11	CARBON 120 5% 1/4W	
R330	1-249-413-11	CARBON 470 5% 1/4W	
R331	1-249-406-11	CARBON 120 5% 1/4W	
R332	1-249-437-11	CARBON 47K 5% 1/4W	
R333	1-249-437-11	CARBON 47K 5% 1/4W	
R334	1-249-437-11	CARBON 47K 5% 1/4W	
R336	1-249-437-11	CARBON 47K 5% 1/4W	
R337	1-249-437-11	CARBON 47K 5% 1/4W	
R338	1-249-437-11	CARBON 47K 5% 1/4W	
R339	1-249-417-11	CARBON 1K 5% 1/4W	
R340	1-249-437-11	CARBON 47K 5% 1/4W	
R341	1-249-429-11	CARBON 10K 5% 1/4W	
R342	1-249-429-11	CARBON 10K 5% 1/4W	
R345	1-249-403-11	CARBON 68 5% 1/4W	
		< CONPOSITION CIRCUIT BLOCK >	
RB301	1-232-976-11	COMPOSITION CIRCUIT BLOCK (10KX8)	
		< SWITCH >	
S301	1-554-303-21	SWITCH, TACTILE (EDIT) (MDS-B3)	
S302	1-762-034-11	SWITCH, TACTILE (ILLUMINATED) (PREVIOUS ⏮)	
S303	1-554-303-21	SWITCH, TACTILE (ENTER) (MDS-B3)	
S304	1-762-033-11	SWITCH, TACTILE (ILLUMINATED) (EJECT ⏏) (including D1)	
S305	1-762-036-11	SWITCH, TACTILE (ILLUMINATED) (REC ●) (including D2) (MDS-B3)	
S306	1-762-034-11	SWITCH, TACTILE (ILLUMINATED) (NEXT ⏭)	
S307	1-572-607-31	SWITCH, PUSH (1 KEY) (CUE/STDBY ⏯) (including D4)	
S308	1-572-609-61	SWITCH, PUSH (1 KEY) (PLAY/PAUSE ▶❚❚) (including D5)	
S309	1-762-035-11	SWITCH, TACTILE (ILLUMINATED) (STOP ■) (including D3)	
S310	1-554-303-21	SWITCH, TACTILE (DISPLAY)	
* S311	1-571-157-11	SWITCH, TOGGLE (PLAY MODE)	
		< VIBRATOR >	
X301	1-579-233-11	VIBRATOR, CERAMIC (5MHz)	

****

EXTENSION | H DRIVE | HP | IN/OUT SW | INTERRUPTER

Ref. No.	Part No.	Description				Remark
*	1-649-499-11	EXTENSION BOARD				
		**********				
		< CAPACITOR >				
C933	1-126-936-11	ELECT	3300uF	20%	16V	(MDS-B3)
		< CONNECTOR >				
* CN907	1-569-503-11	PIN, CONNECTOR 8P				
CN908	1-564-710-11	PIN, CONNECTOR (PC BOARD) 8P				
**********						
*	A-4649-454-A	H DRIVE BOARD, COMPLETE (MDS-B3)				
*	A-4649-960-A	H DRIVE BOARD, COMPLETE (MDS-B4P)				
		**********				
		< CAPACITOR >				
C401	1-163-038-00	CERAMIC CHIP	0.1uF		25V	(MDS-B3)
C402	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C405	1-104-476-11	FILM	2200PF	5%	630V	(MDS-B3)
C406	1-135-159-21	TANTALUM CHIP	10uF	10%	20V	(MDS-B3)
C407	1-164-336-11	CERAMIC CHIP	0.33uF		25V	(MDS-B3)
		< CONNECTOR >				
CN403	1-750-491-11	PIN, CONNECTOR (PC BOARD) 3P				(MDS-B3)
CN404	1-750-496-11	PIN, CONNECTOR (PC BOARD) 2P				
CN406	1-750-498-11	PIN, CONNECTOR (PC BOARD) 4P				
		< DIODE >				
D401	8-719-033-60	DIODE	F1P2STP			(MDS-B3)
D402	8-719-033-60	DIODE	F1P2STP			(MDS-B3)
D403	8-719-033-60	DIODE	F1P2STP			(MDS-B3)
D404	8-719-033-60	DIODE	F1P2STP			(MDS-B3)
D405	8-719-033-60	DIODE	F1P2STP			(MDS-B3)
D406	8-719-033-60	DIODE	F1P2STP			(MDS-B3)
		< IC >				
IC401	8-759-244-73	IC	TC74ACT540F			(MDS-B3)
IC402	8-759-243-19	IC	TC7SU04F			(MDS-B3)
		< TRANSISTOR >				
Q401	8-729-017-97	TRANSISTOR	ME8P06-TE16F3			(MDS-B3)
Q402	8-729-017-97	TRANSISTOR	ME8P06-TE16F3			(MDS-B3)
Q403	8-729-017-96	TRANSISTOR	ME6N10-TE16F3			(MDS-B3)
Q404	8-729-017-96	TRANSISTOR	ME6N10-TE16F3			(MDS-B3)
		< RESISTOR >				
R401	1-216-097-00	METAL CHIP	100K	5%	1/10W	(MDS-B3)
R402	1-216-097-00	METAL CHIP	100K	5%	1/10W	(MDS-B3)
R403	1-216-097-00	METAL CHIP	100K	5%	1/10W	(MDS-B3)
R404	1-216-097-00	METAL CHIP	100K	5%	1/10W	(MDS-B3)
R405	1-216-298-00	METAL CHIP	2.2	5%	1/10W	(MDS-B3)
R406	1-216-298-00	METAL CHIP	2.2	5%	1/10W	(MDS-B3)
R426	1-216-298-00	METAL CHIP	2.2	5%	1/10W	(MDS-B3)
R427	1-216-298-00	METAL CHIP	2.2	5%	1/10W	(MDS-B3)
R430	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R431	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R432	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R433	1-216-138-00	METAL CHIP	3.3	5%	1/8W	(MDS-B3)
R434	1-216-138-00	METAL CHIP	3.3	5%	1/8W	(MDS-B3)
R435	1-216-138-00	METAL CHIP	3.3	5%	1/8W	(MDS-B3)
R436	1-216-138-00	METAL CHIP	3.3	5%	1/8W	(MDS-B3)
R437	1-216-296-00	METAL CHIP	0	5%	1/8W	(MDS-B3)
R439	1-216-296-00	METAL CHIP	0	5%	1/8W	(MDS-B3)
R451	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R452	1-216-073-00	METAL CHIP	10K	5%	1/10W	
**********						
*	1-652-950-11	HP BOARD				
		********				
		< ENCAPSULATED COMPONENT >				
FB552	1-236-163-11	ENCAPSULATED COMPONENT	1000PF			
FB652	1-236-163-11	ENCAPSULATED COMPONENT	1000PF			
		< JACK >				
J705	1-764-849-11	JACK (PHONES)				
**********						
*	1-647-652-11	IN/OUT SW BOARD				
		**********				
		< CONNECTOR >				
CN412	1-750-497-11	PIN, CONNECTOR (PC BOARD) 3P				
		< SWITCH >				
S401	1-571-300-21	SWITCH, ROTARY (IN/OUT)				
**********						
*	1-647-653-11	INTERRUPTER BOARD				
		**********				
		< IC >				
IC403	8-759-071-52	IC	ON1023-S			
**********						

IO (1) IO (2) JACK LED LOADING MOTOR

Ref. No.	Part No.	Description			Remark
*	1-650-444-11	IO (1) BOARD			
		**********			
		< CAPACITOR >			
C540	1-130-467-00	MYLAR	470PF	5%	50V
C541	1-130-467-00	MYLAR	470PF	5%	50V
C590	1-124-478-11	ELECT	100uF	20%	25V
C591	1-124-478-11	ELECT	100uF	20%	25V
C592	1-130-467-00	MYLAR	470PF	5%	50V
C593	1-130-467-00	MYLAR	470PF	5%	50V
		< CONNECTOR >			
CN502	1-691-994-11	PIN, CONNECTOR (PC BOARD) 5P			
		< ENCAPSULATED COMPONENT >			
FB501	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB502	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB550	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB551	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
		< JACK >			
J501	1-764-394-11	CONNECTOR (XLR TYPE) 3P (ANALOG CH-1 L IN) (MDS-B3)			
J551	1-764-393-11	CONNECTOR (XLR TYPE) 3P (ANALOG CH-1 L OUT)			
		< RESISTOR >			
R590	1-249-441-11	CARBON	100K	5%	1/4W
R591	1-249-441-11	CARBON	100K	5%	1/4W
**********					
*	1-649-495-11	IO (2) BOARD			
		**********			
		< CAPACITOR >			
C640	1-130-467-00	MYLAR	470PF	5%	50V
C641	1-130-467-00	MYLAR	470PF	5%	50V
C690	1-124-478-11	ELECT	100uF	20%	25V
C691	1-124-478-11	ELECT	100uF	20%	25V
C692	1-130-467-00	MYLAR	470PF	5%	50V
C693	1-130-467-00	MYLAR	470PF	5%	50V
		< CONNECTOR >			
CN602	1-691-994-31	PIN, CONNECTOR (PC BOARD) 5P			
		< ENCAPSULATED COMPONENT >			
FB601	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB602	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB650	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
FB651	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
		< JACK >			
J601	1-764-394-11	CONNECTOR (XLR TYPE) 3P (ANALOG CH-2 R IN) (MDS-B3)			
J651	1-764-393-11	CONNECTOR (XLR TYPE) 3P (ANALOG CH-2 R OUT)			
		< RESISTOR >			
R690	1-249-441-11	CARBON	100K	5%	1/4W
R691	1-249-441-11	CARBON	100K	5%	1/4W
**********					
*	1-649-501-11	JACK BOARD			
		**********			
*	3-906-054-01	BRACKET (HP)			
		< CAPACITOR >			
C351	1-162-294-31	CERAMIC	0.001uF	10%	50V
		< ENCAPSULATED COMPONENT >			
FB351	1-236-163-11	ENCAPSULATED COMPONENT	1000PF		
		< JACK >			
J351	1-562-837-21	JACK (REMOTE)			
		< COIL >			
L351	1-410-509-11	INDUCTOR	10uH		
**********					
*	1-649-503-11	LED BOARD			
		*********			
		< LED >			
LED301	8-719-043-22	LED GL7E202 (NEXT PLAY)			
**********					
*	1-647-654-11	LOADING MOTOR BOARD			
		**********			
		< CONNECTOR >			
CN409	1-750-496-11	PIN, CONNECTOR (PC BOARD) 2P			
**********					

Ref. No.	Part No.	Description				Remark
*	1-649-500-11	PRI BOARD				
		*********				
		< CONNECTOR >				
* CN4	1-580-940-11	PIN, CONNECTOR 4P				
		< SWITCH >				
⚠S2	1-572-675-11	SWITCH, POWER VOLTAGE CHANGE (VOLTAGE SELECTOR)				
⚠S3	1-572-675-11	SWITCH, POWER VOLTAGE CHANGE (VOLTAGE SELECTOR)				
**********						
*	A-4649-829-A	PS BOARD, COMPLETE (MDS-B4P)				
*	A-4673-166-A	PS BOARD, COMPLETE (MDS-B3)				
		**********				
	1-533-293-11	FUSE HOLDER				
		< CAPACITOR >				
⚠C3	1-161-742-00	CERAMIC	0.0022uF	20%	400V	
⚠C4	1-161-742-00	CERAMIC	0.0022uF	20%	400V	
⚠C5	1-161-742-00	CERAMIC	0.0022uF	20%	400V	
⚠C6	1-161-742-00	CERAMIC	0.0022uF	20%	400V	
C901	1-164-159-11	CERAMIC	0.1uF		50V	
C902	1-126-950-11	ELECT	330uF	20%	35V	
C903	1-124-572-11	ELECT	100uF	20%	63V	
C904	1-161-494-00	CERAMIC	0.022uF		25V	
C905	1-161-494-00	CERAMIC	0.022uF		25V	
C906	1-104-773-11	ELECT	22000uF	20%	16V	
C907	1-124-898-11	ELECT	4700uF	20%	16V	
C911	1-136-165-00	FILM	0.1uF	5%	50V	
C912	1-136-165-00	FILM	0.1uF	5%	50V	
C913	1-124-564-11	ELECT	4700uF	20%	25V	
C914	1-124-564-11	ELECT	4700uF	20%	25V	
C917	1-124-360-00	ELECT	1000uF	20%	16V	
C918	1-124-360-00	ELECT	1000uF	20%	16V	
C930	1-126-939-11	ELECT	10000uF	20%	16V	(MDS-B3)
C931	1-126-919-11	ELECT	6800uF	20%	6.3V	(MDS-B3)
C932	1-126-919-11	ELECT	6800uF	20%	6.3V	(MDS-B3)
		< CONNECTOR >				
CN2	1-580-939-11	SOCKET, CONNECTOR 4P				
CN3	1-580-939-11	SOCKET, CONNECTOR 4P				
CN901	1-695-001-11	PIN, CONNECTOR (PC BOARD) 12P				
CN902	1-569-494-21	SOCKET, CONNECTOR 8P				
* CN903	1-564-509-11	PLUG, CONNECTOR 6P				
* CN904	1-564-509-11	PLUG, CONNECTOR 6P				

Ref. No.	Part No.	Description				Remark
		< DIODE >				
D901	8-719-312-47	DIODE	RBA-406B			
D902	8-719-200-02	DIODE	10E2			
D903	8-719-933-33	DIODE	HZS6A1L			
D904	8-719-200-02	DIODE	10E2			
D905	8-719-200-02	DIODE	10E2			
D906	8-719-200-02	DIODE	10E2			
D907	8-719-200-02	DIODE	10E2			
D908	8-719-987-63	DIODE	1N4148M			
D909	8-719-987-63	DIODE	1N4148M			
D911	8-719-200-02	DIODE	10E2			
D912	8-719-200-02	DIODE	10E2			
		< FUSE >				
⚠F901	1-576-104-11	FUSE (2A/250V) (US, Canadian)				
⚠F901	1-532-203-00	FUSE, TIME-LAG (2A/250V) (AEP, UK)				
⚠F902	1-576-104-11	FUSE (2A/250V) (US, Canadian)				
⚠F902	1-532-203-00	FUSE, TIME-LAG (2A/250V) (AEP, UK)				
⚠F903	1-576-096-11	FUSE (0.4A/250V) (US, Canadian)				
⚠F903	1-532-066-00	FUSE, TIME-LAG (0.4A/250V) (AEP, UK)				
⚠F904	1-576-100-11	FUSE (1A/250V) (US, Canadian)				
⚠F904	1-532-078-00	FUSE, TIME-LAG (1A/250V) (AEP, UK)				
⚠F905	1-576-100-11	FUSE (1A/250V) (US, Canadian)				
⚠F905	1-532-078-00	FUSE, TIME-LAG (1A/250V) (AEP, UK)				
		< IC >				
IC901	8-759-633-42	IC	M5293L			
		< COIL >				
⚠L1	1-421-915-11	COIL, LINE FILTER				
		< RESISTOR >				
R901	1-249-437-11	CARBON	47K	5%	1/4W	
R902	1-247-807-31	CARBON	100	5%	1/4W	
R903	1-247-807-31	CARBON	100	5%	1/4W	
**********						
*	1-649-900-11	REG (A) BOARD				
		**********				
		< CAPACITOR >				
C915	1-124-477-11	ELECT	47uF	20%	25V	
C916	1-136-165-00	FILM	0.1uF	5%	50V	
C921	1-136-165-00	FILM	0.1uF	5%	50V	
C922	1-136-165-00	FILM	0.1uF	5%	50V	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les components identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

REG (A) REG (D) RF

Ref. No.	Part No.	Description			Remark
		< CONNECTOR >			
* CN906	1-564-509-11	PLUG, CONNECTOR 6P			
		< IC >			
IC904	8-759-146-55	IC uPC2412HF			
IC905	8-759-604-45	IC M5F79M12L			
**********					
*	1-649-899-11	REG (D) BOARD			
		**********			
		< CAPACITOR >			
C909	1-164-159-11	CERAMIC	0.1uF		50V
C910	1-164-159-11	CERAMIC	0.1uF		50V
C919	1-164-159-11	CERAMIC	0.1uF		50V
C920	1-164-159-11	CERAMIC	0.1uF		50V
C923	1-124-443-00	ELECT	100uF	20%	10V
C924	1-124-443-00	ELECT	100uF	20%	10V
		< CONNECTOR >			
* CN905	1-564-509-11	PLUG, CONNECTOR 6P			
		< IC >			
IC902	8-759-144-82	IC uPC2405HF			
IC903	8-759-144-82	IC uPC2405HF			
**********					
*	A-4649-450-A	RF BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C201	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C202	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C215	1-126-395-11	ELECT	22uF	20%	16V
C216	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C219	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C220	1-126-602-11	ELECT CHIP	3.3uF	20%	50V
C221	1-104-640-11	FILM CHIP	0.22uF	5%	16V
C223	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C224	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C225	1-104-557-11	FILM CHIP	0.033uF	5%	16V
C226	1-126-191-11	ELECT	0.47uF	20%	50V
C227	1-126-395-11	ELECT	22uF	20%	16V
C228	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C229	1-126-395-11	ELECT	22uF	20%	16V
C230	1-137-286-11	FILM CHIP	0.0022uF	5%	16V
C231	1-104-563-11	FILM CHIP	0.1uF	5%	16V
C232	1-104-559-11	FILM CHIP	0.047uF	5%	16V

Ref. No.	Part No.	Description			Remark
C233	1-126-395-11	ELECT	22uF	20%	16V
C234	1-104-563-11	FILM CHIP	0.1uF	5%	16V
C240	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C241	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C242	1-126-191-11	ELECT	0.47uF	20%	50V
C243	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C244	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C245	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C250	1-126-395-11	ELECT	22uF	20%	16V
C251	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C252	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C253	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C254	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C255	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C256	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C257	1-104-555-11	FILM CHIP	0.022uF	5%	16V
C258	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C259	1-126-193-11	ELECT	1uF	20%	50V
C260	1-135-159-21	TANTALUM CHIP	10uF	10%	20V
C261	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C262	1-135-159-21	TANTALUM CHIP	10uF	10%	20V
C265	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C267	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C268	1-126-191-11	ELECT	0.47uF	20%	50V
C269	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C270	1-126-395-11	ELECT	22uF	20%	16V
C271	1-104-544-11	FILM CHIP	0.0027uF	5%	50V
C272	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C273	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C274	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C280	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C281	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C282	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C284	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C285	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C286	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C287	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C288	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C294	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C295	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C296	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
		< CONNECTOR >			
CN201	1-580-888-11	SOCKET, CONNECTOR (SMT) 18P			
CN202	1-580-876-11	SOCKET, CONNECTOR (SMT) 5P			
* CN203	1-695-241-11	PIN, CONNECTOR (PC BOARD) 8P			
CN205	1-750-491-11	PIN, CONNECTOR (PC BOARD) 3P			
* CN206	1-750-494-31	PIN, CONNECTOR (PC BOARD) 6P			

RF

Ref. No.	Part No.	Description	Remark
CN207	1-750-279-11	CONNECTOR, FFC/FPC 24P	
CN208	1-750-279-11	CONNECTOR, FFC/FPC 24P	
* CN210	1-695-241-11	PIN, CONNECTOR (PC BOARD) 8P	
CN211	1-750-490-11	PIN, CONNECTOR (PC BOARD) 2P	
CN212	1-750-491-11	PIN, CONNECTOR (PC BOARD) 3P	
		< DIODE >	
D202	8-719-029-88	DIODE HSM198STL	
D203	8-719-016-74	DIODE 1SS352	
D204	8-719-017-76	DIODE MA8030	
D205	8-719-977-03	DIODE DTZ5.6B	
		< IC >	
IC205	8-752-057-45	IC CXA1082BQ	
IC206	8-759-981-48	IC TL082M	
IC207	8-759-009-06	IC MC14052BF	
IC208	8-759-745-64	IC NJM4560M	
IC209	8-752-064-34	IC CXA1381R	
IC213	8-759-242-70	IC TC7WU04F	
IC214	8-759-300-71	IC HD14053BFP	
IC215	8-759-300-71	IC HD14053BFP	
IC216	8-759-242-64	IC TC4W53F	
		< FERRITE BEAD >	
L201	1-543-948-11	BEAD, FERRITE (CHIP)	
L202	1-543-948-11	BEAD, FERRITE (CHIP)	
L203	1-543-948-11	BEAD, FERRITE (CHIP)	
L204	1-543-948-11	BEAD, FERRITE (CHIP)	
		< TRANSISTOR >	
Q201	8-729-424-08	TRANSISTOR UN2111	
Q202	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q203	8-729-101-07	TRANSISTOR 2SB798-DL	
Q204	8-729-421-19	TRANSISTOR UN2213	
Q205	8-729-901-06	TRANSISTOR DTA144EK	
Q209	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q210	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R111	1-216-295-00	METAL CHIP 0 5% 1/10W	
R112	1-216-295-00	METAL CHIP 0 5% 1/10W	
R201	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R203	1-218-754-11	METAL CHIP 120K 0.5% 1/10W	
R211	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R212	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R213	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R214	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R215	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R216	1-216-085-00	METAL CHIP 33K 5% 1/10W	

Ref. No.	Part No.	Description	Remark
R217	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R218	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R219	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R220	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R221	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R222	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R223	1-216-660-11	METAL CHIP 2.4K 0.5% 1/10W	
R224	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R225	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R226	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R227	1-216-662-11	METAL CHIP 3K 0.5% 1/10W	
R228	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R229	1-216-699-11	METAL CHIP 100K 0.5% 1/10W	
R230	1-216-661-11	METAL CHIP 2.7K 0.5% 1/10W	
R231	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R232	1-216-699-11	METAL CHIP 100K 0.5% 1/10W	
R233	1-216-697-91	METAL CHIP 82K 0.5% 1/10W	
R234	1-216-691-11	METAL CHIP 47K 0.5% 1/10W	
R235	1-216-695-11	METAL CHIP 68K 0.5% 1/10W	
R236	1-208-812-11	METAL CHIP 18K 0.5% 1/10W	
R237	1-218-769-11	METAL CHIP 510K 0.5% 1/10W	
R240	1-218-754-11	METAL CHIP 120K 0.5% 1/10W	
R241	1-216-691-11	METAL CHIP 47K 0.5% 1/10W	
R242	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R243	1-216-675-11	METAL CHIP 10K 0.5% 1/10W	
R244	1-218-766-11	METAL CHIP 390K 0.5% 1/10W	
R245	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R246	1-216-667-11	METAL CHIP 4.7K 0.5% 1/10W	
R247	1-208-799-11	METAL CHIP 5.1K 0.5% 1/10W	
R248	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R249	1-216-028-00	METAL CHIP 130 5% 1/10W	
R250	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R252	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R253	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R254	1-216-699-11	METAL CHIP 100K 0.5% 1/10W	
R255	1-208-799-11	METAL CHIP 5.1K 0.5% 1/10W	
R256	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R257	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R258	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R259	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R260	1-216-047-00	METAL CHIP 820 5% 1/10W	
R261	1-218-281-11	METAL CHIP 18 5% 1/2W	
R262	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R263	1-216-045-00	METAL CHIP 680 5% 1/10W	
R264	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R265	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R266	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R267	1-216-692-11	METAL CHIP 51K 0.5% 1/10W	
R268	1-218-772-11	METAL CHIP 680K 0.5% 1/10W	

RF SERVO DRIVE

Ref. No.	Part No.	Description			Remark
R270	1-216-049-00	METAL CHIP	1K	5%	1/10W
R271	1-216-121-00	METAL CHIP	1M	5%	1/10W
R272	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R273	1-216-049-00	METAL CHIP	1K	5%	1/10W
R274	1-216-121-00	METAL CHIP	1M	5%	1/10W
R275	1-216-044-00	METAL CHIP	620	5%	1/10W
R276	1-216-097-00	METAL CHIP	100K	5%	1/10W
R277	1-216-697-91	METAL CHIP	82K	0.5%	1/10W
R278	1-216-073-00	METAL CHIP	10K	5%	1/10W
R279	1-216-049-00	METAL CHIP	1K	5%	1/10W
R280	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R281	1-208-799-11	METAL CHIP	5.1K	0.5%	1/10W
R282	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W
R283	1-216-073-00	METAL CHIP	10K	5%	1/10W
R284	1-216-097-00	METAL CHIP	100K	5%	1/10W
R285	1-216-049-00	METAL CHIP	1K	5%	1/10W
R286	1-216-073-00	METAL CHIP	10K	5%	1/10W
R287	1-216-049-00	METAL CHIP	1K	5%	1/10W
R288	1-216-073-00	METAL CHIP	10K	5%	1/10W
R289	1-216-073-00	METAL CHIP	10K	5%	1/10W
R290	1-216-073-00	METAL CHIP	10K	5%	1/10W
R291	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R292	1-216-081-00	METAL CHIP	22K	5%	1/10W
R293	1-216-049-00	METAL CHIP	1K	5%	1/10W
R294	1-216-092-00	METAL CHIP	62K	5%	1/10W
R295	1-216-021-00	METAL CHIP	68	5%	1/10W
R296	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R297	1-218-236-91	METAL CHIP	1	10%	1/4W
R298	1-216-679-11	METAL CHIP	15K	0.5%	1/10W
R299	1-216-674-11	METAL CHIP	9.1K	0.5%	1/10W

< VARIABLE RESISTOR >

RV201	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV202	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV203	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV204	1-241-392-11	RES, ADJ, METAL GLAZE 1K
RV205	1-241-393-21	RES, ADJ, METAL GLAZE 2.2K
RV206	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K
RV207	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV208	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV209	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K
RV210	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV211	1-241-396-11	RES, ADJ, METAL GLAZE 22K
RV212	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K
RV215	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K

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Ref. No.	Part No.	Description			Remark
*	A-4649-658-A	SERVO DRIVE BOARD, COMPLETE			
		**********			
*	4-875-327-01	HEAT SINK			
*	4-922-525-01	HEAT SINK			
	7-685-871-01	SCREW +BVTT 3X6 (S)			

< CAPACITOR >

C408	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C409	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C410	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C411	1-126-204-11	ELECT CHIP	47uF	20%	16V
C412	1-126-204-11	ELECT CHIP	47uF	20%	16V
C413	1-126-204-11	ELECT CHIP	47uF	20%	16V
C414	1-126-204-11	ELECT CHIP	47uF	20%	16V
C415	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C416	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C417	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C418	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C419	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C420	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C421	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C422	1-126-206-11	ELECT CHIP	100uF	20%	6.3V

< CONNECTOR >

* CN401	1-695-008-11	PIN, CONNECTOR (PC BOARD) 8P
CN402	1-750-490-11	PIN, CONNECTOR (PC BOARD) 2P
* CN405	1-695-241-11	PIN, CONNECTOR (PC BOARD) 8P
CN407	1-750-491-11	PIN, CONNECTOR (PC BOARD) 3P
* CN408	1-750-494-31	PIN, CONNECTOR (PC BOARD) 6P

< IC >

IC404	8-759-823-11	IC LA6523
IC405	8-759-823-11	IC LA6523
IC406	8-759-089-53	IC uPC79M05HF
IC407	8-759-144-82	IC uPC2405HF
IC408	8-759-144-82	IC uPC2405HF

< RESISTOR >

R407	1-216-001-00	METAL CHIP	10	5%	1/10W
R408	1-216-001-00	METAL CHIP	10	5%	1/10W
R409	1-216-001-00	METAL CHIP	10	5%	1/10W
R410	1-216-073-00	METAL CHIP	10K	5%	1/10W
R411	1-216-073-00	METAL CHIP	10K	5%	1/10W
R412	1-216-687-11	METAL CHIP	33K	0.5%	1/10W
R413	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R414	1-216-093-00	METAL CHIP	68K	5%	1/10W
R415	1-216-687-11	METAL CHIP	33K	0.5%	1/10W
R416	1-216-001-00	METAL CHIP	10	5%	1/10W
R417	1-216-001-00	METAL CHIP	10	5%	1/10W

Ref. No.	Part No.	Description			Remark
R418	1-216-073-00	METAL CHIP	10K	5%	1/10W
R419	1-216-073-00	METAL CHIP	10K	5%	1/10W
R420	1-216-687-11	METAL CHIP	33K	0.5%	1/10W
R421	1-216-687-11	METAL CHIP	33K	0.5%	1/10W
R453	1-216-295-00	METAL CHIP	0	5%	1/10W
R454	1-216-295-00	METAL CHIP	0	5%	1/10W
R456	1-216-295-00	METAL CHIP	0	5%	1/10W
**********					
*	1-652-127-11	SIO BOARD			
		*********			
		< ENCAPSULATED COMPONENT >			
FB350	1-239-403-11	FILTER, EMI	180PF		
FB351	1-239-403-11	FILTER, EMI	180PF		
FB352	1-239-403-11	FILTER, EMI	180PF		
FB353	1-239-403-11	FILTER, EMI	180PF		
FB354	1-239-403-11	FILTER, EMI	180PF		
FB355	1-239-403-11	FILTER, EMI	180PF		
		< CONNECTOR >			
J350	1-766-161-11	CONNECTOR (D-SUB PLUG) (RS232C)			
**********					
*	A-4673-106-A	232C BOARD, COMPLETE			
		**********			
	1-540-044-11	SOCKET, IC			
		< CAPACITOR >			
C350	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C351	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C352	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C353	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C355	1-163-095-00	CERAMIC CHIP	12PF	5%	50V
C356	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C359	1-124-779-00	ELECT CHIP	10uF	20%	16V
C360	1-124-779-00	ELECT CHIP	10uF	20%	16V
C361	1-124-779-00	ELECT CHIP	10uF	20%	16V
C362	1-124-779-00	ELECT CHIP	10uF	20%	16V
C363	1-126-926-11	ELECT	1000uF	20%	10V
C364	1-124-779-00	ELECT CHIP	10uF	20%	16V
C365	1-125-486-11	DOUBLE LAYERS	0.22F		5.5V
		< CONNECTOR >			
* CN350	1-506-503-61	PIN, CONNECTOR 9P			
* CN351	1-564-340-00	PIN, CONNECTOR 6P			
* CN352	1-564-336-00	PIN, CONNECTOR 2P			
CN353	1-580-460-11	SOCKET, CONNECTOR 26P			
CN354	1-580-460-11	SOCKET, CONNECTOR 26P			

Ref. No.	Part No.	Description			Remark
* CN357	1-564-338-00	PIN, CONNECTOR 4P			
		< DIODE >			
D350	8-719-992-02	DIODE	RB705D		
D351	8-719-992-02	DIODE	RB705D		
D352	8-719-800-76	DIODE	1SS226		
D353	8-719-800-76	DIODE	1SS226		
D354	8-719-992-02	DIODE	RB705D		
D355	8-719-992-02	DIODE	RB705D		
		< IC >			
IC351	8-759-324-38	IC	HD6473258P10-B3-4		
IC352	8-759-269-58	IC	LC3564QMF-10-TLM		
IC353	8-759-927-04	IC	SN74HCT138ANS		
IC355	8-759-038-27	IC	MC145407P		
		< JUMPER RESISTOR >			
JW350	1-216-295-00	METAL CHIP	0	5%	1/10W
		< TRANSISTOR >			
Q350	8-729-805-45	TRANSISTOR	2SC3395		
Q351	8-729-823-57	TRANSISTOR	2SA1655		
		< RESISTOR >			
R350	1-216-089-00	METAL CHIP	47K	5%	1/10W
R354	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R355	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R356	1-216-073-00	METAL CHIP	10K	5%	1/10W
R357	1-216-089-00	METAL CHIP	47K	5%	1/10W
R358	1-216-089-00	METAL CHIP	47K	5%	1/10W
R359	1-216-089-00	METAL CHIP	47K	5%	1/10W
R360	1-216-089-00	METAL CHIP	47K	5%	1/10W
R361	1-216-041-00	METAL CHIP	470	5%	1/10W
R362	1-216-041-00	METAL CHIP	470	5%	1/10W
		< VIBRATOR >			
X350	1-579-594-11	VIBRATOR, CRYSTAL (19.8804MHz)			
**********					

Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
55	1-751-780-11	WIRE (FLAT TYPE) (26 CORE)	
57	1-751-781-11	WIRE (FLAT TYPE) (15 CORE)	
59	1-765-253-11	WIRE (FLAT TYPE) (26 CORE)	
61	1-751-830-11	WIRE (FLAT TYPE) (24 CORE)	
65	1-751-782-11	WIRE (FLAT TYPE) (16 CORE)	
121	1-751-068-11	WIRE (FLAT TYPE) (24 CORE)	
⚠214	8-583-005-11	DEVICE, MINIATURE DISK KMS-140C	
HR901	1-500-006-11	HEAD, OVER LIGHT (MDS-B3)	
M401	A-4660-373-A	MOTOR ASSY (LOADING)	
M901	X-4944-046-1	MOTOR ASSY (SLED)	
⚠T1	1-426-898-12	TRANSFORMER, POWER	
**********			
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-467-284-11	REMOTE COMMANDER (RM-DC1) (MDS-B3)	
⚠	1-551-812-11	CORD, POWER (US, Canadian)	
⚠	1-590-910-11	CORD SET, POWER (AEP, UK)	
	1-765-107-11	CORD, CONNECTION (MDS-B3)	
	2-536-133-01	LABEL, WARNING, OUTDOOR (US, Canadian)	
*	3-702-670-01	TOOL (TRANSPORT)	
	3-703-080-21	LABEL, COUTION (TOP) (AEP, UK)	
	3-703-845-01	LABEL (N) (U/C), MAIN CAUTION	
	3-757-820-01	MANUAL, OPERATION (ENGLISH) (MDS-B3)	
	3-757-821-01	MANUAL, OPERATION (FRENCH) (MDS-B3:Canadian, AEP)	
	3-757-822-01	MANUAL, OPERATION (GERMAN) (MDS-B3:AEP)	
	3-757-824-01	MANUAL, OPERATION (ENGLISH) (MDS-B4P)	
	3-757-825-01	MANUAL, OPERATION (FRENCH) (MDS-B4P:Canadian, AEP)	
	3-757-826-01	MANUAL, OPERATION (GERMAN) (MDS-B4P:AEP)	
*	3-759-061-01	INSTRUCTION (TRANSPORT)	
	4-395-504-01	COVER, BATTERY (MDS-B3)	
	4-875-574-00	SHEET, PROTECTION	
*	4-941-548-01	LABEL, CLASS (1) (AEP, UK)	
*	4-950-766-01	LABEL, FCC DIGITAL DEVICE (US, Canadian)	
*	4-963-114-01	INDIVIDUAL CARTON (MDS-B3)	
*	4-963-115-01	CUSHION (A)	
*	4-963-116-01	CUSHION (B)	
	4-963-118-01	INDIVIDUAL CARTON (MDS-B4P)	
*	4-970-188-01	CARTON, OUTER (MDS-B3)	
*	4-970-189-01	CARTON, OUTER (MDS-B4P)	
**********			

Ref. No.	Part No.	Description	Remark
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S	
#2	7-621-259-39	SCREW +P 2.6X5	
#3	7-682-546-09	SCREW +B 3X5	
#4	7-682-561-09	SCREW +B 4X8	
#5	7-682-660-09	SCREW +PS 4X6	
#6	7-685-871-01	SCREW +BVTT 3X6 (S)	
#7	7-682-548-09	SCREW +BVTT 3X8 (S)	
#8	7-621-775-10	SCREW +B 2.6X4	
#9	7-621-770-XX	SCREW +BVTT 2.6X8 (S)	
#10	7-621-775-00	SCREW +B 2.6X3	
#11	7-621-592-00	SCREW +K 2.6X6	
#12	7-621-772-10	SCREW +B 2X4	
#13	7-627-852-08	SCREW, PRECISION +P 1.7X2.5	
#14	7-627-551-28	SCREW, PRECISION +P 1.4X2.5	
#15	7-627-552-78	SCREW, PRECISION +P 1.7X3.5 (MDS-B3)	
#16	7-627-852-98	SCREW, PRECISION +P1.7X4.5TYPE3	
#17	7-627-552-48	SCREW, PRECISION +P 1.7X4	
#18	7-627-852-38	SCREW, PRECISION +P1.7X1.8TYPE3	
#19	7-621-255-35	SCREW (2MMX5), + PWH	
#20	7-621-770-67	SCREW +BVTT 2.6X6 (S)	
#21	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
#22	7-682-948-01	SCREW +PSW 3X8	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les components identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

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